VOLUME LVIII APRIL, 1902 No. 4

AMERICAN
JOURNAL OF INSANITY

ETIOLOGY OF PARESIS.[1]

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Dementia paralytica, or paresis, has been recognized and studied for about one hundred years, but it is probable that only during the past fifty years has it received that sort of investigation which familiarity with the disease, accuracy of diagnosis and the accumulation of a sufficient number of cases for reliable statistical purposes would lead us to regard as of real scientific value.

A careful analysis of the histories of paretics during the last half-century has limited the assigned causes of the disease to a comparatively small number on which all observers are practically agreed, but with wide divergence as to the relative importance to be given to the several factors. These are syphilis, (acquired), alcohol, mental stress and worry, heredity (including inherited syphilis) cerebral traumatism, sunstroke and lead poisoning.

That a history of syphilis is present in a large number of patients is established, but it is doubtful whether we are yet in a position to subscribe to the dictum "no syphilis, no paresis." Krafft-Ebing has included another factor in his euphemistic and alliterative phrase "Civilization and syphilization." The statistics of different authors vary widely. Thus 64 observers found

[1] Read before the Medical Society of the State of New York, at Albany, on January 28, 1902.

a history or marks of syphilis in paretics in percentages varying from 11 to 94 per cent, as collected by Peterson, Mott, Hirschl and others.

In the cases of paresis coming under my observation for the past 10 years a percentage of 20 was found, but this is undoubtedly far too low, for there are many elements in hospital practice which tend to render it impossible to obtain reliable histories. For instance, many of our patients, because of their mental condition, are unable to give a history, whereas it might have been obtained earlier in the disease, before they had reached that state of mental aberration which led to their commitment to a hospital. Again, from the nature of the case, such a history is frequently not obtainable from friends, sometimes because they are honestly ignorant of the previous existence of a disease so usually concealed, while at other times, even when they are cognizant of it, from motives of pride or delicacy, they persist in concealing the fact. Moreover, not a few of the patients come from walks of life many of whose members, through ignorance or inattention, never recognize the infection, or attach no importance to it. Or it may happen that they have dismissed it from their minds because they were told by some physician that they were cured. Finally, a large number of those that are too demented to give a history themselves have been depraved and wanderers so long that they have no friends who could enlighten us.

Taking all these factors into consideration, among them that in European countries (older than ours) the percentages seem higher, it is probable that at least 60 per cent of paretics have suffered in former years from syphilis. When we consider that this is about ten times the percentage of syphilis in insanity generally considered, the coincidence is truly startling and we are forced to the conclusion that if not the direct cause lues is still a factor of such overwhelming preponderance as to occupy a most important relation to the disease. But, it has been urged that, granting 60 to 70 per cent of paretics have a specific history, there still remain 30 to 40 per cent to be accounted for. There is undoubtedly a residue which must be assigned to other causes, but the foregoing statement has by no means the force that it might appear to have at first sight, inasmuch as it is found that, if one takes one hundred patients with

specific lesions on the skin—not paretics or mental cases—sometimes a history of lues is obtainable in a no larger percentage than in the same number of cases of paresis. Thus, one observer in London in a Lock hospital found that eighty per cent or less of skin cases gave a specific history—where, as he knew, all were syphilitic,—a percentage no higher than some have found in paresis. Hirschl, quoted by Krafft-Ebing, found (in the syphilitic ward of Prof. Lange in Vienna) that out of 63 cases of the late forms of syphilis a certain history of specific infection was obtainable in only 54 per cent and a probable history in 9.5 per cent, whereas in 36.5 per cent, in spite of the existing evidence of lesions, no history was obtained. As compared with these figures another observer found among his paretics a luetic history undoubted in 56 per cent, probable in 25 per cent, and wanting in 19 per cent respectively. In this series of investigations it will, therefore, be seen that the histories in the cases of skin syphilis fell short of those obtainable in paretics by 17.5 per cent. Furthermore, a series of experiments was attempted abroad which, it is needless to say, could not be carried out in this country, by which 9 undoubted cases of paresis with no obtainable history of syphilis were all inoculated with syphilitic virus and kept under careful observation. Not one of these developed syphilis. The most obvious inference from this is that notwithstanding the absence of history all had previously suffered from the disease and were therefore immune.

Dr. Mott has pointed out among certain other considerations worthy of notice. First: That in Iceland, where syphilis is unknown, paresis is never encountered, and that the only case ever seen was in a syphilitic foreign sailor. Against this, however, it should be recorded that in Egypt and Japan, where syphilis is very common, paresis is very rare, but here again is to be noted the fact that there is very little mental stress and over-exertion in fatalistic Egypt and in Japan. In these countries, civilization, with its rush and hurry, is of comparatively recent development,—of about twenty-five years perhaps,—introducing a new factor which we will consider later.

Secondly.—That the clergy, priests and Quakers, who are very rarely affected with syphilis, show a very great freedom from paresis.

In this connection Krafft-Ebing quotes from the Deggendorf asylum report that out of 1090 patients there were 17 priests, not one of whom had paresis, whereas out of 15 soldiers 8 were paretics, a percentage of 61.5. He also says that Bouchaud, collecting statistics from France, records that of 288 priests admitted only 9, or 3 per cent, were cases of paresis. Krafft-Ebing himself reports that among 1000 male paretics he found only one Catholic priest, and he had contracted syphilis while a student.

Again, he says that in rural districts, where syphilis and mental stress are both less prominent, paresis is correspondingly rare, and that both correspondingly increase on approach to the great cities. In the canton of Wallis in Switzerland, where syphilis is extremely rare, the percentage of paretics to the total number of male admissions to the asylum is only 1.1 per cent.

Mendel showed that in 1876 the percentage of paretics in an asylum of the agricultural provinces of Sleswick-Holstein and Hanover amounted to only 4.56 per cent, whereas in the urban institution of Brandenburg and in Berlin the percentages were 19.7 and 26 respectively.

In the rural portions of Ireland, where syphilis is very rare, paresis is almost unknown, and the same is recorded by Hougberg as regards Finland. In one institution in each country the paretics amounted to only 7.03 per cent of the total number of admissions and as regards sex the proportion showed 11 men to 1 woman. Krafft-Ebing also quotes Hougberg as reporting that of 107 paretics admitted between 1875 and 1892 there was not a single man from the country, whereas city laborers afforded numerous instances. Arnaud, in the *Annales méd. psychol.* for 1888, wrote that in the large cities of France paresis was four times more frequent than in the country districts. Blaschko's Danish researches prove that the same proportion exists between the city and country in syphilis as in paresis; viz. about 4 to 1.

Again, while syphilis affects all classes of men it is rare among the upper classes of women. Paresis is likewise found in all classes of men but rarely among the higher classes of women.

Furthermore, the relative frequency of syphilis in men and women is about the same as of paresis; viz., about 4 to 1.

In Denmark, where an enumeration of those afflicted with

venereal diseases is attempted, Blaschko states that the proportion of venereal diseases in men and women is 4.1 to 1, while Idanoff, collecting statistics regarding paresis, finds the proportion between the sexes to be 3.49 to 1.

I have not as yet spoken of the increase of the disease in modern times, but it is a striking fact that whereas a few years ago juvenile paresis was a great rarity whole series of cases are now available for study. Alzheimer in connection with his series of young paretics obtained in 91 per cent a history of a foregoing syphilis—in the great majority hereditary. Fournier found 100 per cent of his 37 cases syphilitic, the disease being mostly hereditary, more rarely acquired. Krafft-Ebing obtained a history of syphilis in 11 of his cases, while in 22 cases under Mott's observation 13 were surely syphilitic, in 4 syphilis could not be excluded, while in the remaining four there was a history of the disease in the mother. Thus with specific signs on the body 60 per cent, or combined with a maternal history 80 per cent, had hereditary syphilis. Now while we find (European statistics) that the proportion of paresis in adults is about 4 men to 1 woman, Mott noticed the striking fact that in his juvenile cases the sexes are about equal. This can only mean that where men have about 4 chances to 1 of acquiring syphilis, compared with women, children have equal chances of inheriting it,—a fact which would tend to sustain Mott's conviction that syphilis was the all predominant factor. Direct heredity seemed to play but little part, for while three of the children had paretic fathers, two of those fathers had a history of early syphilis and had transmitted well marked signs of that disease to their children, and it may well be inferred that their early lues had more to do with the development of paresis in their children than had their own dementia paralytica.

As regards heredity, however, it must be said that some observers give it a much greater prominence, not perhaps in the way of a direct transmission of the disease, but of the transmission of a neuropathic diathesis from any of the recognized forms of mental or nervous disease by providing a soil in which paresis may readily flourish. Paresis *per se*, so far as my experience goes, may justly be regarded as one of the least transmissible of mental diseases as compared with the functional psychoses which seem preeminently so.

Näcke, as quoted by Berkley, supports the view that an invalid brain is prone to develop paresis from acquired syphilis. Thus, in an investigation of one hundred paretics he found 50 per cent with certainty having a cerebral defect, and with probability in a greater number. He holds that a defective brain with acquired syphilis is most frequently the foundation for the development of paresis, and that without the defective brain the specific infection would not have had this result. But it must be seen that the converse is also true,—that without syphilis the defective brain would not have developed paresis, a position of view consonant with that of those who hold syphilis to be the prime cause, but giving greater prominence, it is true, to the inherited favorable conditions.

As to the transmission of the disease in any sense *per se*, it seems probable that the consensus of opinion that heredity plays only a minor part, in the present state of our knowledge, is a safe conclusion. In my experience the victims of paresis have not been feeble individuals, inheritors of disease, but are the active, the robust, the hale fellows, the free and generous livers.

Alcohol was formerly considered by French writers to be a very frequent cause of paresis. At present they have modified this view somewhat. Inebriety so often belongs to those who have syphilis; it is so often a feature in the lives of those undergoing great mental strain and anxiety; it is so often developed along with other irregularities by paretics in the first stage,—an effect rather than cause,—that it is difficult to assign to it a definite rôle. If no syphilitics were addicted to alcohol, and no alcoholics had syphilis, it would be an easy matter to determine which class furnished the paretics, but Venus and Bacchus have ever gone hand in hand and to differentiate is difficult. Dr. Mickle, fifteen years ago, regarded alcohol as a cause in as high a percentage as 23.5 in men,—but at the present time I feel sure it would not be accorded so prominent a part. Alcoholism produces disastrous results in human brains, it is true, but these results seem to be *sui generis* and somewhat distinctive —a false rather than a true paresis. That it is a factor and an adjunct, however, to other causes is most probable; that by itself it is efficient in a moderate number of cases seems quite possible;

that it is an active aid to syphilis is most probable; that it is a not infrequent accompaniment is undoubted. Many specific cases, however, give no history of alcohol.

Injuries to the head are assigned in a small number of cases. In some there seems to be possibly no other element and I am not prepared to deny that a severe cerebral injury may in itself be sufficient to cause the disease, although I am free to say that in the greater number of instances under my own personal observation in which cerebral injury is said to have been the sole cause, by diligent inquiry, I have been able to find in almost every case a history of preceding syphilis. The paresis has sometimes developed so soon after the injury as to make the relatives sure that it was the sole cause, but with a latent specific history in almost all these cases I am inclined to think that trauma is simply the ripening element, bringing to the surface that which was ready to appear at any time. I am rather of the opinion that many of these cases would never have developed paresis from the blow, had it not been for the antecedent syphilis. Of the etiological significance of poisoning by lead, tobacco, etc., it can only be said that such effects must be put down as problematical. There is a small percentage of cases in which one or other of these have been held responsible in the absence of any other apparent cause. It is fair to say that while the influence of such poisons might be sufficient, the number of cases depending upon them is too small to constitute them important factors.

I have so far omitted any extended consideration of mental over-strain, worry, anxiety, but these seem to supply a somewhat essential element. Paresis has been called "the disease of the nineteenth century." It seems hard to believe that with syphilis existing for thousands of years we should not have had paresis recognized in earlier centuries, had it existed, by those good observers in medicine who always have been found, no matter what their times or enlightenment. If syphilis has been the sole cause, paresis must have prevailed earlier and if so it must have been recognized and gotten into the literature. If we take the other alternative and conclude that it did not exist to any such extent as now, we must see what distinguishes the nineteenth century from those that have preceded it.

The great contrast, it seems to me, lies in what must be

termed "civilization." An era of inventions, of electricity, of rapid means of communication, and of business competition, has called forth more and more mental exertion and struggle. This is a very trite remark and the point would not be referred to had it not a special bearing here. The increase of paresis with the progress of the century has been something remarkable, if we are to believe European authorities. Thus in Deggendorf, a Bavarian institution, the number of paretics, which from 1869 to 1874 had amounted to 9.3 per cent of men and 5.2 per cent of women, showed in the years from 1885 to 1890 an increase to 23.2 per cent of men and 9.3 per cent of women. At Eichburg the number of paretics has been almost doubled. In some of the cities, particularly Berlin and Munich, still more remarkable percentages of increase have been noted. In this country, however, I have not been able to find such a rapid increase as Continental figures would indicate for Europe.

The great and increasing mental anxiety and over-exertion of this century seem, then, to offer the principal contrast with those which have preceded, and it seems fair to assume that these, combined with syphilis, may supply the exciting cause in the largest proportion of cases. Egypt has but little mental stress, worry or anxiety; it is a country of fatalism; whatever is, is accepted; there is lacking the mental rush and over-exertion of Western Europe and America, and it is precisely in Western Europe and in America that paresis is most largely found.

As regards the subject of tabes, Sachs, quoted by Peterson, says, "The very frequent development of tabes after dementia paralytica and of dementia paralytica after tabes proves the close relationship between the two diseases; and since tabes is beyond doubt a form of syphilitic disease there is sufficient ground for thinking that dementia paralytica has the same etiological imprint." To this objection is made that if the relationship is so close there should be a closer approximation as regards the percentages of specific histories obtainable in the two diseases. Thus, in tabes we find a history of syphilitic infection in 80 to 90 per cent of the cases, whereas in paresis it is somewhat less frequent—in 60 per cent on an average, for we have found the percentages varying from 11 to 90 per cent, according to the experience of the observers, the nationality of the patients, their social condition, and locality of residence.

This lack of approximation may be partly accounted for by the fact that the mental condition of tabetics often enables them to give a clear history of syphilis, which it is impossible to obtain in the mentally obscured paretic. Furthermore, while the two diseases without doubt often develop one into the other; after all, according to my experience, the incidence of the two is not so frequent or so striking as to make the problem an insistent one for solution. When we consider that the brain is affected in one case and in the other the cord,—different parts of one system it is true, but different nevertheless—and that other considerations may affect the possibility of accurate histories in paretics, we may feel that the cases are not exactly parallel and that the arguments on either side are somewhat inconclusive.

Again it is urged that if paresis were the result of syphilis we should obtain the same beneficial effects from anti-specific remedies in paresis that we get in ordinary brain syphilis. This apparently is a very strong argument against the theory of a specific origin, and its consideration would lead us into the domain of pathology, a topic reserved for another paper, and for a pathologist. It may be said, however, if Mott's contention be true, that in paresis it is the neuron that is attacked, whereas in ordinary brain syphilis it is the meninges, especially of the base, and the arteries, with the formation of gummata etc., we may have here the true explanation, for the neurons, as he demonstrates, are incapable of regeneration—according to the dictum of Virchow, who says: "A cell nourishes itself and is not nourished,"—while the structures concerned in ordinary brain syphilis can be affected by treatment. In other words, according to Mott, it is simply a question of what structure is involved in the disease process and not a question of the identity of the cause that determines the effect of treatment. This brings to mind the query of Allan McLane Hamilton who asks "Are there any varying toxins in syphilis, some more active, which attack the skin and mucous membrane, and the like, and show immediate effects, and another toxin which has as yet eluded us, which lies dormant for many years until it finally shows itself in either disease of the brain or spinal cord?"

But whether syphilis acts directly as a cause of cerebral

changes, producing what we call paresis, or indirectly by lowering vitality, preparing the way or predisposing, the result is practically the same, and we must admit that in one way or the other it is the most potent cause of paresis, but that there are other causes that must be recognized as acting as adjuncts."

It seems justifiable in the present state of our knowledge to conclude:

That syphilis is the most common factor in the production of paresis.

That it may cause it directly—an exciting cause.

That it may cause it indirectly by bringing about such a devitalization of the system generally as to render other influences operative—a predisposing cause.

That it is not usually the sole cause, but that there is associated with it the deleterious effect of mental stress and over-excitement, dissipation and alcoholism, and heredity.

That in a certain relatively small number of cases mental stress, worry or over-work may be the sole ascertainable cause.

That traumatism may also be the cause in a still smaller proportion of cases, but that in many of them it acts as a developing or ripening agent of an incipient paresis in a syphilitic subject.

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THE EARLY DIAGNOSIS OF PARESIS.[1]

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It is with much hesitation that I attempt to discuss so difficult a subject as the early recognition of paresis, for here we are confronted with borderland conditions and overlapping states. I know of no subject which is so important and no subject concerning which error is more frequently made both on account of the gradual invasion and also because of the generalized character of the symptoms. The recognition of the disease in its early stage is especially difficult because, in the average case, general disturbances for a long time precede the appearance of special symptoms indicative of organic change. In cases in which a satisfactory and detailed history of the very early period can be obtained, we usually receive an account of general ill-health, an ill-health evidenced both by complaints on the part of the patient, as well as by the observations of his friends. As a rule, we find that the patient has not been well for some time,—usually months. If during this preliminary period of ill-health, the patient visit his physician, the case is not infrequently mistaken for one of neurasthenia, and yet when the symptoms presented are closely analyzed, it is found that they resemble those of neurasthenia only superficially. It is true we have quite commonly the symptom of ready fatigue and in addition inability to maintain the attention for any length of time upon affairs of business or other every-day matters. Notwithstanding, the typical fatigue syndrome of neurasthenia is wanting, as an analysis of the early symptoms will show. The friends of the patient often maintain that his appearance and manner

[1] Read before the Medical Society of the State of New York, at Albany, January 28, 1902.

have changed, that he no longer attends to his business as carefully or no longer does his work as well as formerly. He may look somewhat tired or perhaps a little sleepy. At times he is pale and at times, again, his face may be unusually flushed; it often lacks its former vigor of expression. His attitude, his movements, his walk may suggest general loss of tone. Sometimes he is troubled with various vague distressing sensations about the head, such as fulness, pressure or constriction, or again he may complain of ringing in the ears, sparks before the eyes, and muscae volitantes. Attacks of giddiness and vertigo may also occur and some patients suffer from a dazed or stunned feeling in the head. Occasionally there are rheumatoid pains referred to the arms, legs and to the back of the neck or trunk. More often, when pain is present, it assumes a distinctly tabetic character, is lightning-like and darting, or now and then may suggest neuralgia. Pain in the head of great severity and simulating migraine is not very infrequent. At times the headache is referred to the supraorbital and adjacent regions and especially to the eye-ball of one side, the attack then suggesting ophthalmic migraine.

In the neurasthenic patient, the symptoms are almost exclusively subjective. He begins by describing to us how he feels, and complains actively of various symptoms. He tells us that he is nervous, is easily excited and upset, that he gets very tired at his work, that his head aches, his heart palpitates, that he has indigestion, that his bowels are constipated. He complains of various diffuse aches or pains which suggest the sensations of simple or exaggerated fatigue. He suffers from occipital headache, from backache, from aching in the limbs and perhaps tenderness over the spine. He presents also quite characteristic signs of atony of digestion or of gastric catarrh and constipation; and very commonly with a history of palpitation of the heart is associated that of coldness and dampness of the extremities.

While there are some superficial resemblances between the symptoms which he details and those found in the early beginning of paresis, we cannot help but note certain striking differences. First, the patient in the early beginning of paresis, if he appears before the physician at all, is generally brought by friends or relatives. Rarely does he come of his own ini-

tiative. Secondly, it is the friends or relatives who detail the symptoms. They give an account of changes which they have noted in the patient and of which he himself may not be cognizant or to which he has paid no attention. The signs of ill-health are first observed by those about him, not by the patient himself, who, as a rule, does not actively complain, unless there are present tabetic or neuralgic pains or attacks of the migraine-like headache. His conduct is in marked contrast to that of the neurasthenic patient, who not only seeks the physician's advice himself, but also has at his tongue's end a long list of complaints with which we are all very familiar. Frequently he comes with memoranda written upon small pieces of paper. Further, the physical appearance of the neurasthenic is rarely changed, or in any case, is not altered in the same manner as is the appearance of the paretic. He may be pale, perhaps, or a trifle thin, but certainly he is not somnolent and his features lack none of their accustomed force. Often the anxiety with regard to his condition causes an accentuation of the facial lines; certainly never an effacement of folds and wrinkles; his face may have an anxious or a worried look, but there is no change of quality in its expression. It is still the same face to friends or relatives. It has not become altered so as to suggest that the patient is a changed man. The friends are never the ones to first discover that the patient is ill and indeed frequently listen to his complaints with impatience and incredulity. No one has noted marked change either in his appearance or manner. Least of all does anyone tell us that the patient attends to his business less carefully or less well than formerly. Further, when we analyze the symptoms which are detailed by the neurasthenic, we find that they are those of chronic fatigue, of occipital headache, of backache, of limbache. There is no account of darting or lightning-like pains. The headache is quite characteristic and there is no occurrence of one or two attacks of terrible neuralgia or migraine-like headache so often met with in the early paretic. Again, the motor phenomena of neurasthenia are those of simple weakness and ready fatigue. There is never a loss of precision in movement, never a loss of accuracy of coordination. It is not observed, for instance, in the neurasthenic mechanic, that his work is done less accurately or in the neurasthenic clerk or book-

keeper that his hand-writing is changed. In the mechanic in the early stage of paresis, inaccuracy and change in the quality of his work are among the first symptoms observed. Further, the deterioration is observed not by himself, but by those about him.

The sleep disturbances of neurasthenia are radically different from those of paresis. The neurasthenic on going to bed as a rule falls asleep readily, but is disturbed at intervals during the night or awakens early in the morning and leaves his bed in an exhausted and depressed condition. After he has taken food, and as the day progresses, his condition steadily improves until the evening, when he is in a relatively good condition. By this time his fatigue symptoms have largely disappeared and many a neurasthenic patient in the evening is in such good condition that he himself will declare that he is no longer ill. In paresis, in the early stage, the opposite condition, as a rule, obtains. Though the patient may suffer from insomnia, dreams or disturbed sleep, he is usually at his best in the morning, but as the day progresses, becomes more and more drowsy until toward evening somnolence may be very marked. Vague and suggestive symptoms, absent in the morning, may be present in the evening and be so pronounced as to attract the attention of those about him. The speech which may have been clear in the morning, may be distinctly thick and blurred in the evening. The face, which has had a relatively normal expression in the morning, may be dull and heavy in the evening; the gait and the gestures may be cumbrous and awkward. Slight disarrangement of the clothing, indifference to the niceties and proprieties, unwonted profanity, coarseness and irritability may also be noted at this time.

The neurasthenic is not only at his best in the evening, but qualitative mental changes are at no time present; in the paretic, on the other hand, qualitative mental changes, although possibly in very slight degree, are noticeable almost at the outset. The mental phenomena of the neurasthenic are essentially quantitative. We have first a marked and characteristic symptom in the diminution of the capacity for intellectual effort. The attempt to do mental work sooner or later brings on symptoms of exhaustion. The task may be properly begun, but soon the patient

experiences difficulty in keeping the attention upon it and if the attempt be persisted in, painful sensations about the head arise, such as a feeling of constriction, headache and giddiness. This difficulty of concentrating the attention may lead to an attitude of distraction and inattention. Mental fatigue is also evidenced by a number of other symptoms. Ideas do not present themselves as readily or in the same rapid succession as in health. There is a distinct decrease in the spontaneity of thought and this the patient himself well recognizes, often saying, "I cannot think." There may also be more or less marked irritability. Trifling occurrences sometimes provoke to anger; just as other inadequate causes, e. g., a play at the theatre or a newspaper account of a murder may excite the patient to laughter or to tears. Together with these symptoms we find that our patient is also introspective. He suffers from a distinct nosophobia. His indigestion suggests to him that he has serious organic disease of the stomach; his palpitation leads him to fear that he has serious disease of the heart. The patient so afflicted not infrequently comes to the physician with the statement that he is afraid he is "going out of his mind," that "he is losing his memory." Indeed, "loss of memory" is one of the most common phrases used by the neurasthenic. How incorrect this expression is, every one of my auditors can testify, for the neurasthenic patient will give a most circumstantial history of his case, not omitting even unimportant details and will in other ways render it clear that there is no actual impairment of memory. Neither is there at any time any inability to properly understand or to correctly reason about ordinary matters. We are at once convinced that there is no qualitative mental change whatever.

The mental condition of the paretic presents in this respect a more or less marked contrast. In the early initial period of his disease, he too becomes readily fatigued; he cannot do his work without an unusual effort and it soon becomes distasteful to him. There is added, however, to this symptom of ready fatigue, a distinct feebleness both in the ability to apprehend and in the ability to remember. Unusual forgetfulness is especially observed as regards the smaller details of life. Distinct and undoubted impairment of memory is one of the first symptoms. The patient's work becomes changed in quality not only because

of slight impairment of coordination of movement, but also because the patient forgets how to do it. In addition there are sooner or later those slight, but constantly recurring changes in habit and lapses in conduct which are so characteristic of paresis. These are all qualitative in character and are indicative of a fundamental alteration in the mental make-up of the individual; the forgetfulness, manifested in neglect of the attire, in neglect of business, in infractions of a long accustomed daily routine, unseemly behavior at the table when eating, gradual obtusion to the proprieties of conduct, all have but one meaning. This dulling of the sensibilities is further made evident by the slight impression which important events, such as a business transaction of consequence, the illness of a near relative or the death of a friend, make upon the patient. A tendency to repetition in conversation, the introduction of unrelated matter and an occasional obscene or profane expression on the part of a man previously precise and careful in his language, are but shadows of events to come. In the neurasthenic, it is unnecessary to point out, such changes as these never occur; the sense of propriety, the sense of duty, the sense of the aesthetic, never become blunted. There is none of that loss of interest in the family, none of that lack of affection for relatives or friends, none of the gross indifference of the paretic. If the neurasthenic cannot follow his daily vocation because of his ill-health, he is worried and distressed. He manifests no indifference to business, and least of all are there found errors or confusion in his accounts. There is none of the gradual rise to the surface of the coarser animal qualities, none of the excessive eating and drinking, none of the beginning indulgence in alcohol or unwonted sexual gratification, no diminution in the nicety and refinement of speech, none of the coarseness and vulgarity seen in the early paretic. No history is elicited of undue familiarity or improper jests with ladies, female servants or others.

In the paretic the mental changes are far more than those of mere weakness, while in the neurasthenic, they are simply and solely those of fatigue. Even when distinct psychopathic factors make their appearance in neurasthenia, they never in the least resemble those of paresis. We need only mention the special fears, the various phobias and obsessions to prove the truth of this assertion.

To my mind the difficulty of the distinction between neurasthenia and the very early stage of paresis is largely due to the loose conception of neurasthenia that prevails. The conception of neurasthenia should be strictly limited to that of the fatigue neurosis; the term neurasthenia should not be applied to any other condition, and to say that a paretic passes through a period of neurasthenia in the early stage of his paresis, is to make a gross misuse of terms. We must separate neurasthenia from certain other morbid states which, while they superficially resemble it, differ from it radically. Among these are especially the nervous conditions which belong to the larvated, undeveloped or prodromal periods of the insanities. The various symptoms of nervous weakness and other nervous manifestations by which such affections are attended, bear no relation whatever to those of neurasthenia. They only superficially resemble the latter and they should be characterized not as neurasthenic, but as neurasthenoid. The term neurasthenic should be applied only to the symptoms of neurasthenia and not to those of other and widely differing affections, and what is true here of the relation of neurasthenia to paresis, is also true of neurasthenia in relation to melancholia and other mental affections. It is just as incorrect to say that a patient has passed through a neurasthenia, which has deepened into a melancholia, as it is to say that a patient has passed through a neurasthenia which has deepened into a paresis. The truth is that such a patient has merely passed through a neurasthenoid stage; he has never been truly neurasthenic.

Paresis in the early portion of its initial period is every now and then confused not only with neurasthenia, but also with hypochondria and melancholia. From hypochondria it is readily distinguished by the same factors which differentiate it from neurasthenia. In simple hypochondria, notwithstanding the nosophobia, there are none of those manifold evidences of qualitative mental changes which are so evident in paresis. There is no mental obtusion and the patient is in close relation with his environment and the facts of his daily life. The fact that many paretic patients are in their early history very hypochondriacal, emphasizes the importance of this differentiation.

Because the initial period of paresis is frequently accompanied

not only by neurasthenoid or hypochondriacal symptoms, but also by marked mental depression, the error is not infrequently made of confounding early paresis with true melancholia. Melancholia we now know to be a symptom-complex of a more extensive affection, namely, melancholia-mania. The latter is a disease largely hereditary, characterized by periods of emotional depression or of exaltation which extend over months of time and which usually recur in successive waves during the life-time of the individual. During the melancholic phase of such a wave, the picture presented is one of intense psychic depression associated with ideas of sinfulness, spiritual ruin, or moral unworthiness. There is the great agony of the lost soul, the hopelessness of a wasted past or the belief in some crime never to be atoned. There is not, however, especially in that early period of which we are now speaking, that blunting of the faculties, that change of the relationship to the environment, which is shown by deterioration of conduct, of dress and of speech. By a searching inquiry as to factors pointing to such degeneration, the differentiation is to be made, as well as, it need hardly be added, by the presence or absence of a history of previous attacks or of a family history of melancholia-mania or allied neuropathies.

In the above remarks I have purposely avoided dealing with the physical signs of paresis for the reason that as soon as these make their appearance, both neurasthenia and melancholia are set aside. I should here, however, mention the importance of an examination of the visual fields which even in the very early stage of paresis may show some contraction,—a forerunner of the more or less marked amblyopia present in advanced cases. Such contraction does not, however, serve to differentiate paresis necessarily from neurasthenia in which, in exceptional cases, contraction of the visual fields occurs as a fatigue symptom. Retinal hyperaesthesia on the other hand, is not a symptom of paresis and its existence would be decidedly in favor of neurasthenia. It is immaterial whether the physical signs first make their appearance as a loss or increase of tendon reactions, as loss of light reflex, as tremor of the lips or tongue, or in the form of speech disturbances. Their significance is always the same. This is also the case with the transient paralytic attacks so frequently met with and I will not here discuss the relative import-

ance of these symptoms, as their occurrence varies so greatly in different cases. My function, I take it, is to deal with that period of paresis before the physical signs become so pronounced as to render the diagnosis absolute. In all doubtful cases, before they have made their appearance, we must be guided in the formation of our opinion, by the outlines which I have indicated in my remarks. I should add, however, that to my mind there is one general physical sign which precedes all of the others and by which we can distinguish often at a glance a case of beginning paresis from a case of neurasthenia or melancholia, and that is that curious and difficult-to-describe something which we term the "paretic manner." It is made up of those slight and almost infinitesimal changes in the facial expression and gestures of the patient which to the clinician stamp the case as one of paresis. I do not mean the gross smoothing out of furrows, the gross loss of tone in the facial muscles, but that something in the eye, the face, the gestures, the words, which reveal that the patient is not in close and accurate touch with his surroundings, with his business affairs, with the fact of his illness or for that matter, with any subject. It is the presence of this symptom which in my opinion places in sharp contrast, the neurasthenic and the beginning paretic. Finally the significance of a history of specific infection, when present, is so obvious that it need not here be dwelt upon.

It is necessary to allude briefly to the differentiation of early paresis from alcoholism, brain syphilis, tabes dorsalis and brain tumor. When we come to draw distinctions between early paresis and alcoholism, we come to a subject of great difficulty and much uncertainty. The difficulty is largely due to the fact that many paretics manifest, as one of their early symptoms, alcoholic excess. It is not necessary before this audience to point out the general principles upon which a differentiation is to be attempted; how we should endeavor to establish the presence or absence of those fundamental qualitative changes which characterize the inception of paresis. If in an alcoholic subject, obtusion to the proprieties and moralities is noted, we should remember that unless alcoholism has become confirmed, these symptoms all disappear during the intervals of sobriety when the patient is free from the action of the poison. In the paretic,

on the other hand, these mental changes persist even after the alcohol has for a time been withdrawn. Further, the symptoms of a beginning alcoholic dementia are rather those of a simple dementia of which speech disturbances, incoordination of movement and somnolence are not features. There is general psychic obtusion, slowness of thought and some impairment of memory. If the alcoholism has become more profound, auditory and visual hallucinations with mental confusion, or it may be, with delusions of persecution or of jealousy, make their appearance. In other words, if alcoholic dementia be pronounced it is likely to resemble confusional insanity on the one hand or paranoia on the other, rather than paresis. Further, it is unnecessary to dwell upon the common symptoms of alcoholism, the bloated and relaxed countenance, the tremor, the gastric catarrh, the morning headache and the frequent peripheral neuritis. It is not necessary to call attention to the absence of pupillary phenomena, of characteristic changes in the knee-jerks, of tabetic pains and especially of the paretic manner. Notwithstanding, as I have just stated, because of the frequent coexistence of paresis and alcoholic abuse, the differentiation is at times exceedingly difficult.

It is not my province here to enter into the extensive subject of the differentiation between paresis and brain syphilis. I can only say that we should remember the general rule that in brain syphilis the symptoms are those of an organic lesion, either limited or diffused without qualitative mental changes. Somnolence and headache may be equally present, but tremor of lips, tongue or hands, slight incoordination, change in the facial expression, the paretic manner, none of these play any rôle in syphilis. In the early stage it is again the absence or presence of the qualitative mental changes that are important. The differential diagnosis may, however, be extremely difficult and at times impossible. Here prolonged observation of the patient is the only satisfactory plan.

The relationship between paresis and locomotor ataxia, in the early stages of the two affections, is another subject which is fruitful of discussion, but one which would here be unsatisfactory; first, because the physical signs in the early stages are very few and secondly because some of them are common to both

affections, e. g., tabetic pains, incoordination of movement, lessening of knee-jerk and beginning optic atrophy. As is well known, many cases which begin with the symptoms of tabes dorsalis end in undoubted paresis. All cases, however, of locomotor ataxia, presenting anomalies of the symptom-complex, such as preservation or exaggeration of the knee-jerk, or slight ataxia of the legs with marked ataxia of the arms,—cases of so-called superior tabes,—should be regarded with suspicion. It must be frankly admitted, however, that in the early stages a differentiation between paresis and tabes may be impossible. This is not surprising when we consider that paresis and tabes are not only very closely related, but are possibly one and the same disease. The pivotal point is again, not the presence or the character of special physical signs, but the presence of mental changes. If these be absent, paresis cannot be diagnosticated. Similar remarks apply to the differentiation between paresis and other gross organic disease of the brain. Brain tumors, for instance, when in silent regions, may produce none but general symptoms, and unless they be situated in the frontal region, mental changes are as a rule entirely wanting. Here again, it is the absence of qualitative mental phenomena upon which in early cases the differentiation is to be based.

Let me say in summarizing my views concerning the early recognition of paresis, that it is of the utmost importance to study carefully the symptoms of every so-called case of neurasthenia that comes before us. After physical signs have made their appearance, the recognition of the disease is relatively easy; but it is during the initial period, the neurasthenoid stage, as I term it, that the diagnosis should be made. It can be made, I believe, in the larger number of cases by bearing in mind the clear and well defined symptomatology of chronic fatigue,—neurasthenia,—on the one hand, and the special symptoms of the mental weakness and degeneration of paresis on the other.

THE COMPARATIVE FREQUENCY OF GENERAL PARESIS.[1]

By CHARLES G. WAGNER, M. D.,

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As part of the symposium on paresis I have been requested to present some statistics bearing upon the occurrence of this disease generally and its frequency in the professions. Accordingly I have gathered the following data from such sources as I have found accessible.

Examination of the literature of paresis discloses that it has been recognized for a period of about eighty years, although claims are made that some cases were reported before the close of the eighteenth century. As early as 1815, Esquirol appears to have noted the fatal ending of paralysis and failure of speech in certain cases of insanity, but his writings do not indicate that he ever had a clear idea of general paresis as a distinct form of disease. One of his students, however, Georget, described it in 1820 under the name of chronic muscular paralysis. Delaye in 1824, called it "incomplete general paralysis," a name which has since been retained as one of those commonly in use. Calmeil published a complete description of the physical symptoms and anatomical lesions in general paresis in 1826, but all of these writers and many others about this period appear to have regarded the malady as a special form of paralysis superimposed upon insanity,—a complication of an already existing mental disorder rather than a distinct form. In 1839, Dr. W. A. F. Browne, Commissioner in Lunacy for Scotland, observed cases in that country, but it was not until 1843 that general paresis was recognized in America. In that year Dr. Luther Bell of the McLean Asylum, now presided over by Dr. Edward Cowles,

[1] Read before the State Medical Society, at Albany, N. Y., January 28, 1902, as part of the Symposium on General Paresis.

detected this disease in a number of patients, all of whom died within a comparatively short time.

Dr. Bell in his annual report for 1843, stated that prior to 1840, he had never met with an instance of paresis in this country, although he had seen many cases abroad and had made diligent search for them in his own asylum and elsewhere on this side of the Atlantic. He says: "I have regarded it as a somewhat curious fact that it is only within the last few years that this disease has been admitted into this institution. As late as my visit to Europe in 1840, it was unknown within our walls, nor, after seeing it there, can I recall any case in our register which would at all meet its characteristics, rendering it certain that it was not overlooked."

Four years later Dr. Pliny Earle, reported several cases at the Bloomingdale Asylum in New York City, and about the same time Dr. Amariah Brigham, of the New York State Lunatic Asylum at Utica, is said to have had similar cases. I find, however, in Dr. Brigham's annual asylum reports only meagre references to general paralysis. In the year 1844 to 1847 he mentions, among the causes of death, paralysis in one or two cases each year. In 1848, the last year of his life, his report shows that five patients died of general paralysis, but in none of his reports does he publish a table showing the forms of insanity in the cases admitted, nor does he discuss the symptoms of the cases mentioned as terminating in death by general paralysis.

The first table of this kind published in the history of the institution at Utica, showing the forms of insanity admitted, is found in the report of Dr. N. D. Benedict for the twelve months ending November 30, 1850, the year following that in which he succeeded Dr. Brigham as superintendent of that institution. His report shows that two cases of general paralysis were admitted during that year and that there had been one remaining in the hospital at the close of the previous year. A few years later, Dr. Ranney of the City Asylum on Blackwell's Island reported several cases as occurring in that institution. In 1866 Dr. John P. Gray, who had succeeded Dr. Benedict at Utica, read a paper before this society in which he gave an exhaustive review of several cases selected from a total of 119 that he had had under his personal observation.

Beginning with the year 1849, when the admission of the first case was recorded at the Utica Asylum the reports of that institution show only a gradual increase in the number of general paretics admitted during the next ten years. The average number of patients of all kinds received annually into the institution during the period mentioned was 329, while the average number of paretics was 5 or 1.5 per cent. The next decade with an average annual admission of 351 patients shows an increase in the number of cases received at the asylum, but a much more rapid increase in the number of general paretics that were annually brought there. The average annual admission of this class for the ten years was 15 or 4.3 per cent—but for the latter half of the decade the percentage was slightly above 5 per cent. This decade covered the Civil War and the four years immediately following. The query naturally arises as to the influence of that period of storm and stress as a causative factor in the production of insanity generally and especially paresis. From 1870 to 1880 the average number of patients received annually at Utica was 434, whereas the average number of paretics received was 21 or about 5 per cent. During the next ten years, from 1880 to 1890, the average number of patients annually admitted was 418 and the average number of paretics was 29, or 7 per cent. For the last decade of the century, that is from 1890 to 1900, the average number of patients received annually was 327 and the average number of paretics was 13, or 4 per cent.

During the fifty years comprising the last half of the nineteenth century there were received at Utica 18,843 insane persons of whom 865 were cases of general paresis, the average percentage being, therefore, 4.5 per cent. The proportion of women to men was 1 to 7.5.

The Hudson River State Hospital was opened in 1871. During the first decade of its existence there were received 1,671 patients, of whom 130 were paretics,—7.75 per cent. During the second decade 3,208 patients were received, of whom 144 or 4.4 per cent were cases of paresis. During the third decade the total number received was 5,735, of whom 361, or 6.3 per cent, were paretics. The total number of patients received in 30 years was 10,434, while the total number of cases of paresis was 672 or 6.4 per cent. Of these patients 75 were women and 597 were men, a proportion of 1 to 8.

From September 30, 1881 to October 1, 1901, there were admitted into the Buffalo State Hospital 8,243 patients. Of this number 391, or 4.74 per cent, were paretics, of whom 65 were women and 332 were men—a proportion of 1 to 5.

The total number of patients received into the St. Lawrence State Hospital from December 9, 1890, when it was opened, to September 30, 1901, was 4,286. The number of cases of general paresis received during the same period was 208, or 4.8 per cent.

There were admitted to the Rochester State Hospital from the date of opening in July, 1891 to September 30, 1901, 1,183 patients, of whom 105, or 5.6 per cent, were general paretics.

At the Middletown State Homeopathic Hospital the number of patients admitted from the date of opening in 1874 to September 30, 1901, was 5,892; of these 292, or 4.9 per cent, were general paretics.

At the Binghamton State Hospital there were admitted on original commitments between October 1, 1890 and September 30, 1901, 2,226 patients; of these 111, or 4.9 per cent, were cases of general paresis—19 being women and 92 men, a proportion of about 1 to 5.

From Dr. A. E. Macdonald, Superintendent of the Manhattan State Hospital, East, I learn that during the past 30 years about 18,000 insane men have been received into that institution under both county and State care. Of this number 16 per cent have been cases of general paresis and the annual admission rate has been nearly constant for several years past.

Although I have not the exact figures showing the number of women admitted to the female department of the Manhattan State Hospital, the reports of the State Commission in Lunacy indicate that it has not differed materially from the number of men received. If, therefore, due allowance be made for the number of paretics that were received among the female cases we should probably find that the percentage of paretics in the total number of cases of insanity received was somewhat above 9 per cent.

The total number of patients received into the Long Island State Hospital at Flatbush from 1896 to September 30, 1901, was 2,141. The number of cases of general paresis admitted during the same period was 250, or 11.5 per cent. Of these paretics 27 were women and 223 were men—a proportion of 1 to 8.

At the Bloomingdale Asylum, White Plains, N. Y.—practically a private institution—there were received during the 10 years ending September 30, 1901, 1,230 patients. Of this number 180 men and 25 women, or 16.6 per cent, were suffering from general paresis, the proportion being 1 woman to 7 men.

During the past 13 years—the period covered by the reports of the State Commission in Lunacy—it appears that there have been received in all the state hospitals of New York State a grand total of 49,787 patients. Of these 3,307—a percentage of 6.6—have been cases of general paresis. This, however, is somewhat lower than the actual percentage of cases received, for the reason that under the operation of the State Care Law the State Commisson in Lunacy has from time to time transferred large numbers of patients from one hospital to another and these transfers have materially swelled the apparent number of admissions as shown by the reports of the Commission, whereas the number of cases of paretics has not been similarly affected by these transfers.

The following table shows the total annual admissions, the number of paretics received and their percentage in the State hospital system of New York State during the past thirteen years:

Year.	Admissions.	Paretics.	Percentage.
1889	1813	98	5.4
1890	1942	66	3.4
1891	2868	80	2.7
1892	2627	114	4.3
1893	2704	132	4.8
1894	4003	152	3.7
1895	3003	161	5.3
1896	5615	399	7.1
1897	4649	423	9.0
1898	5542	448	8.0
1899	5243	414	7.8
1900	4862	396	8.0
1901	4916	424	8.6
	49787	3307	6.6

In the *Journal of Mental Science* for July, 1900, Dr. Arthur E. Patterson, senior assistant medical officer of the City of

London Asylum at Dartford, analyzes 1,000 admissions, of whom 620 were men. Of the latter 76 or 12 per cent were general paretics, whereas of the 380 women 8, or not quite 3 per cent, were cases of general paralysis. The proportion of men to women suffering from this disease was 6 to 1. Of the men 43 were married, 30 were single, 1 was a widower, and in 2 instances the condition as to marriage was unknown. Of the women 4 were married, 3 were widowed and 1 was single. It would thus appear that the disease is met with more frequently in the married than in the single.

Only 2 of the men were under 30 years of age, 34 were between 30 and 40, and 30 were between 40 and 50,—whilst 10 were between 50 and 60. These figures show that no less than 64 out of the total 76 men were between the ages of 30 and 50, whereas all of the women were between 30 and 40.

A recent report of the medical superintendent of the Cane Hill Asylum in the county of London shows that of 402 patients admitted during 12 months 42 suffered from paresis, 38 of whom were men while 4 were women. Paretics, therefore, formed 10.4 per cent of the admissions, the proportion of women to men being 1 to 9.

At the Claybury Asylum in the same county for a similar period there were admitted 820 cases of insanity. Of these 87 were paretics, 71 being men and 16 women. Paretics, therefore, formed 10 per cent of the total admissions, and the proportion of women to men was 1 to 4.5. Of the men received 18 per cent were cases of paresis.

At Hanwell Asylum the year's admissions numbered 534. Of the men 19 per cent were paretics and of the women 5 per cent.

OCCUPATION.

Of 1300 cases of paresis recorded at the Manhattan State Hospital, East, only 8 were actors while 7 were lawyers and 5 were physicians—the clergy not being represented. It would appear that while no particular profession, trade, business or occupation especially predisposes the individual to an attack of general paresis, every walk of life is represented. Among the cases under consideration were 109 ordinary laborers, 59 clerks, 45 tailors, 37 drivers, 35 bartenders, 32 painters, 32 cigarmakers, 31 car-

penters, 29 salesmen, 28 shoemakers, 26 waitresses, 23 merchants, 20 machinists, 16 printers, 16 butchers, 17 bakers, 16 barbers, 16 engineers, 15 peddlers, 14 cooks, 13 musicians, 13 porters, 12 blacksmiths, and so on down through more than 200 different occupations.

Among 672 paretics at the Hudson River State Hospital were 10 civil engineers, 6 lawyers, 4 military or naval officers, 3 physicians, and 2 authors.

Out of 208 at the St. Lawrence State Hospital there were 2 physicians, 35 laborers, 14 farmers, 6 commercial travelers, 11 railway employees and 20 housewives.

Among 120 cases at the Rochester State Hospital were 3 lawyers, 6 shoemakers, 5 merchants, 5 farmers, 8 laborers, 6 painters.

In 239 cases at the Buffalo State Hospital there were 4 physicians, 3 lawyers, 2 clergymen, 1 editor, 2 actors, 2 artists and 2 musicians.

At Flatbush among 250 cases there were 6 druggists, 3 musicians, 1 physician, 1 veterinary surgeon, 1 artist and 1 dentist.

At the Bloomingdale Asylum, among 180 men admitted, there were 9 lawyers, 5 physicians, 4 actors, 4 theatrical managers, 2 musicians, 1 teacher, 28 merchants, 27 clerks, 8 manufacturers, 8 brokers, 6 saloonkeepers, 4 police officers and 2 civil engineers.

In all of the institutions except Bloomingdale the laboring classes are largely represented.

DURATION.

To Dr. Louis C. Pettit, second assistant physician at the Manhattan State Hospital, East, I am indebted for valuable data regarding the duration of the disease collected by him from the wards and records of that institution. Thirteen hundred patients observed lived after admission an average period of eleven months each, the disease showing an average duration prior to admission of fifteen and three-fourths months. The total average duration of these cases was, therefore, a little more than two years. Thirty-two nations and over 250 occupations were represented in this death roll from general paresis. Of these paretics there were 484 of American birth, 335 Germans, 244 Irish, 71 English, 31 French, while the remaining 135 were

about evenly distributed through 20 other nationalities, among them being two Chinamen. These figures show a remarkable preponderance of native Americans suffering from general paresis in an institution where more than two-thirds of the inmates were of foreign birth and over 80 per cent of foreign parentage.

Dr. Pettit gives an interesting table which tends to show that general paresis rarely occurs before the twentieth year or after the age of sixty. In the 1300 cases tabulated death occurred as follows:

Age at death.	Cases.
20 to 25 years	4
25 to 30 "	72
30 to 35 "	173
35 to 40 "	250
40 to 45 "	272
45 to 50 "	212
50 to 55 "	152
55 to 60 "	89
60 to 65 "	53
65 to 70 "	20
70 to 75 "	2
75 to 80 "	1
	1,300

Dr. Asher of the Dalldorf Asylum, Berlin, reports in the *Allgemeine Zeitschrift für Psychiatrie*, Vol. XLVI, No. 1, that of 643 cases of general paresis in men treated in that institution two-thirds were between the ages of 35 and 50. The average duration of life after admission was 14½ months and only 16.8 per cent lived two years after admission.

In 305 cases in which the date at which the symptoms first attracted attention was ascertained, the average duration was 26 months. The progress of the disease seemed to be more rapid in the younger subjects. Between the ages of 20 and 35 the average duration of institution life was 13½ months; between 35 and 50, 14½ months, and between 50 and 70, 15 months.

Dr. Asher found a definite hereditary predisposition in 33 per cent, and syphilitic infection in 35 per cent. Alcoholic in-

temperance was alleged in 37.6 per cent and injury to the head in 9 per cent of the cases.

The AMERICAN JOURNAL OF INSANITY for January, 1896, contains a report showing that of 200 male cases of paresis in Krafft-Ebing's clinic in Vienna, 56 per cent were certainly syphilitic, 25 per cent probably so, while in 19 per cent the data were insufficient to warrant a conclusion of probable syphilis.

In all the records of paresis studied in preparing this paper I have found but a single instance of alleged recovery from the disease.

From this brief survey of the statistics of general paresis it would appear that it forms about 8.75 per cent of all cases of insanity; that it occurs most frequently between the ages of 30 and 50; that it is gradually increasing in frequency at the present time; that men are about 7 times as liable to the disease as women; that it is invariably fatal in its termination and usually so in less than two and a half years. Furthermore, that it is nearly twice as frequent in large cities as in the country and that heredity, syphilitic infection, and alcoholic indulgence are important factors in its production. That neither the members of the learned profession, teachers, students, musicians, nor actors, appear to be especially susceptible, nor does intellectual work or any other special kind of occupation seem to predispose the individual to paresis, but that general cerebral strain with more or less hereditary influence is found to have existed in the majority of cases. Overwork, sexual excesses, alcoholism, irregular habits of sleeping and eating and such accidents as sunstroke and cerebral traumatism appear to be the great factors in the production of this disease.

TREATMENT OF PARESIS; ITS LIMITATIONS AND EXPECTATIONS.

By EDWARD COWLES, M. D., Waverley, Mass.

The "*treatment of paresis,*" as a subject for discussion, presents itself, at first sight, as difficult and uninspiring in view of its hopelessness. But I am asked to speak especially of the "*limitations and expectations*" of treatment; this leads the way to a field of inquiry in which lie some of the profoundest problems in medicine. The time now available being brief, I shall speak of our present unsatisfactory means of treatment of a disease as yet regarded as incurable, only to indicate the *limitations* under which we labor.

The diagnosis being made, the prognosis being a fatal ending usually after two to four years in which the manifestations of the disease have been recognized, we are limited to measures for palliating its consequences. The patient needs immediate protection when the onset of the disease is an acute attack of melancholia or mania; when the dementia comes on insidiously, protection is equally important of the personal and business interests both of the patient and his family. Custodial measures become therapeutic together with treatment of general symptoms, when remissions are promoted through improvement in physical health and strength, neurasthenic conditions being especially characteristic of the prodromic and early stages of the disease. The prescribed method always includes "tonics" in all appropriate forms, and a generous diet with interdiction of alcohol. Hydrotherapeutics, now coming into more general use, are often beneficial.

It is aside from all these generally indicated expedients for the management of the cases that the real therapeutic problem arises and baffles our art. The psychiatrist finds himself here in a remarkable position; it is that of being confronted by a well-defined mental disease-form, with concurrent physical signs

more distinctive than in any other mental disease. These point, by both sensory and motor symptoms, to lesions of the nervous system that show a recognizable underlying disease-process with progressive structural changes producing chiefly extensive degeneration of the nervous system. More than in any other of the true mental diseases, which are such because the mental symptoms essentially constitute the disease-form, have researches in anatomical pathology been possible in the attempts to find an explanation of the mental symptoms. But, for some recent years, little advancement of our knowledge in this direction has been made. Therefore the psychiatrist, who must really do his clinical work from the standpoint of the general physician, has found a barren field of *limitations* for his therapeutic guides when he turns to neurological histology and pathological findings. This is a most significant fact, for, so far as this line of research can go, we are likely to come to the same limits in other forms of mental disease should there ever be discovered concomitant structural changes characteristic of them. The pathological anatomist as our pioneer leads us to this frontier of our realm,—to the Castle Mystery, and lays siege to it; when he fails to carry it by assault, he saps and mines, and employs the strategy of hypothesis, spies of subtle inference and arrows of swift conjecture, often Parthian arrows indeed. Still we wait before the impenetrable wall of our difficulty. It is with us, both in general medicine and psychiatry, much as it was with our fathers when they said the signs of inflammation were heat, redness and swelling. The work of penetration into that which underlies has gone deeper, but our attitude of inquiry remaining precisely the same, we have the superficial replaced by the parenchymatous. We are reaching the limits of knowledge through the study of change in structural form and appearances to the eye; the infinitesimal becomes the insurmountable. We are learning that, inasmuch as psychology and physiology can tell us nothing to explain the normal mechanism of mental activities, we can not expect to see, through the microscope, an explanation of disordered thought and feeling.

It would be a cause of great regret on my part if there should seem to be any disposition, in the hospital work which I represent, to diminish in the least the importance of research in patho-

logical anatomy. But there are reasons for seeking an explanation of our clinical problems in the still deeper underlying plane of physiological chemistry. Let me quote from a statement made from this point of view.[1] "That microscopically visible structural changes in any tissue, or in the cells of any tissue, must be preceded by more or less pronounced metabolic changes is surely self-evident. Metabolic changes are chemical changes. Chemical changes are the physical exchanges and transformations that take place in the physical units of matter—the molecules; and the molecules are beyond the ken of the microscopist."

Turning now to aetiology in accordance with the principles of general medicine, we find limitations in the logic of treatment under the leading conceptions of the aetiological factors of paresis which are syphilis and heredity, with alcohol and the stress of modern life contributing. Following the guidance offered by these factors it has been common, outside of the hospitals, when the diagnosis is made and there is a suspicion of syphilis, to treat the cases with mercurials and iodides; in the hospitals this is found to be so futile and even harmful that the practice advocated by many alienists is generally followed in using antisyphilitic treatment only when active syphilis is present. With respect to heredity authorities differ. Our experience at the McLean Hospital agrees with that of many observers in the evidence it gives that paresis is due less to heredity than other forms of insanity. The rôle of heredity, in whatever relation it may bear to insanity in general, is that of inducing a constitutional instability. This neuropathic weakness when transmitted from a syphilitic parentage, or when induced as a sequel to an acquired syphilis, is regarded as having a like influence with stress from excessive mental activity. These predisposing factors working together tend to determine which part of the overworked mechanism is to yield to the active cause of the paretic disease. Alcohol may be a contributing factor also by reducing the normal resistance to morbid influences. In these ways comes the conception of neurasthenic conditions, constitutional or acquired, as having an intimate relation with the onset

[1] Dr. Otto Folin, Chemical Laboratory, McLean Hospital. Notes on relation of pathological chemistry to pathological anatomy.

and course of the disease-process. Hence arise questions of early differential diagnosis between neurasthenia and paresis. Undoubtedly a neurasthenia may be the first to appear, when it is only the effect, and not a part of the cause, of the still unrecognized general paralysis. A history of syphilis always excites suspicion. Out of these aetiological considerations we get, so far, no clearer guides for treatment; antisyphilitic measures, theoretically indicated, fail, and we are left to deal with a general and very empirical conception of neurasthenia.

The history of the course that has been taken by the study of this problem leads to an interesting field. While the *limitations* of our therapeutics continue to be apparent, I can now enter upon the second part of my subject—the *expectations* of treatment. That paresis has its chiefest cause in specific disease is not a conclusion from any discoverable relations between known specific and paretic lesions. The arguments deal with the prevalence in cases of paresis of a history of acquired syphilitic infection, or of its inherited effects. This doctrine is gaining ground, although some authorities demur; it is argued that syphilis not being proven in many cases it should be held not as an essential but only a predisposing cause. Krafft-Ebing's dictum that general paralysis is a product of civilization and syphilization, and Oppenheim's statement that paresis is the outcome of stress and syphilis, give expression to opinions that indicate no more than a sequence of facts, showing the frequency with which specific infection is followed by paresis. As explanatory of a probable real connection in the pathology of these two diseases, it is becoming generally assumed that there is some intervening factor, or condition, that unites them. Oppenheim points to this in making the distinction that people without syphilis, but who are the subjects of mental stress, excitement and excesses, are liable to develop neurasthenia; the syphilitic neurasthenic, however, is liable to dementia paralytica. That there may, or must be, an intermediate element between the two diseases is now either intimated or assumed by most writers, and alike by the advocates of the two leading theories of their pathogenesis relating respectively to the nervous and the vascular systems. We need not dwell upon the arguments for the opposing hypotheses, as to which is first in the disease-process, because they refer alike to

the toxaemias as intervening factors. Though still hypothetical this indicates, at least, the trend of the time in medicine.

We come now to the subject that is of prime importance in our discussion of *expectations* in the treatment of paresis, and of our grounds for them; our problem lies distinctly in the field of general medicine putting the general physician and psychiatrist in precisely the same position toward it. It is not my part here to discuss the pathology of this disease, but it may be permissible to cite briefly some authoritative statements that set forth the aspects of the problem which I wish to consider.

Dr. Mott in the Archives of Neurology for 1899, indicating his reasons for supposing that paresis is a primary degeneration of the neurone with secondary inflammatory changes, says, in other words, that "it is a parenchymatous degeneration due to a loss of durability of the nerve-cell—a premature decay of tissue in which inherited and acquired conditions take part, with the result that progressive death of the latest and most highly developed nervous structures ensues as soon as their initial energy is unable to cope with the antagonistic influences of environment."

Kraepelin,[2] regarding the changes in the nerve parenchyma as the primary alteration, thinks that the microscopic pictures of paretic lesions indicate intoxication. He says that everything points to a grave nutritional disorder, and that the disease is analogous to myxoedema, diabetes, osteomalacia, acromegaly, and the like; he suggests that we have to assume an intervening element between syphilis and paresis, just as we have, for example, a myxoedema develop when the thyroid becomes destroyed by tuberculosis.

Wernicke,[3] regarding a primary destruction, or necrosis, of the nerve tissue, analogous to the degenerative neuritis in the peripheral nervous system, as the primary process, says the paralytic aetiology resembles most the action of poisons. But in general paralysis we must assume that the poison is constantly being produced in the body, as the progressive fatal characteristics can not be otherwise explained. This poison must be metasyphilitic, yet we must assume a bacterial action as the basis

[2] Psychiatrie, 6th ed. Leipzig, 1899.
[3] Grundriss der Psychiatrie, 1900, Leipzig.

of the peculiar condition. The purport of this is that, as in other progressive remitting diseases, the acute and quiescent phases of paresis represent, respectively, the resistive reaction of the body to some toxin, and remissions of its activity indicating cessation of the toxaemia. The views of authorities generally harmonize with the conception of intervening factors. These may, of course, have their place outside of, as well as in, the nervous system itself, and elsewhere in the body. Although such representative opinions do not yet furnish us with guides to treatment, as they hardly take us beyond the stage of hypothesis, yet, nevertheless, they point to a toxaemic origin in the pathogenesis. Thus we as psychiatrists find ourselves engaged in the general movement of the time; and sharing in the great advancement in general medicine we are encouraged in our expectations of things hoped for, in our special field of mental medicine.

On the common ground of general medicine, it is of interest to refer to a statement, made from this point of view by Sir Dyce Duckworth, of the principles upon which our new position is based. In an address, in November, 1900, to the British Medico-Psychological Association on "Mental Disorders Dependent on Toxaemia" he expressed the generally accepted opinions. He said that toxaemic states have been long recognized as clinical features of disease, and the sources of them are as varied as are the separate toxic elements which induce them. Progress in physiological chemistry and bacteriology has now furnished us with the means to explain these conditions. Referring to the action of auto-intoxications in disturbing the harmony of intimate brain-cell metabolism, he noted the deliria of many febrile conditions as examples of distinct toxic infections. After mentioning myxoedema as leading, in like manner, to mental disorders resulting from altered metabolism due to deficient thyroidal influence, it is stated that general paralysis is now regarded as coming into the category of auto-intoxications. His suggestion as to the course of the pathogenesis is one of the interesting variations of the hypothesis. Syphilis although the common antecedent of paresis does not, however, provide the toxin, and we must therefore view its part in the aetiology as leading to progressive degenerative nervous changes, which in turn so modify the inti-

mate metabolism of the tissues as to set free toxic elements. As the various toxic agents which gain admission to the circulation manifest elective affinities for particular systems of neurons, hence the varied results of perverted nutrition and metabolism with the production of new toxins. While these fields of study are yet much unexplored, there are many investigators in them, and here and there knowledge is gained that guides to treatment.

We have now come in this discussion, nearly to its ending, yet upon the grounds so far considered we find ourselves still in the region of hypotheses with waiting expectations of new light upon the treatment of paresis, but with reasonable faith in their final realization. To this practical end, indeed, we may be nearer than has yet been supposed. A new phase of the problem has been presented in contributions by Dr. Bruce, and Dr. Ford Robertson at a meeting, last June, of the Medico-Chirurgical Society of Edinburgh. Dr. Bruce, in his observations of paresis for a number of years noted the common occurrence of gastric and intestinal disorders, with exacerbations accompanied by rise of temperature and hyperleucocytosis. He suspected a toxaemia due to intestinal bacteria. Obtaining blood-serum by wet cupping for lumbago from a paretic patient having a well-marked remission in the second stage, he treated two earlier progressing cases with subcutaneous injections daily for three weeks. The result was complete remissions in both cases then of two years duration. Further experiments are in progress, to procure blood-serum from a horse immunized to bacillus coli. Dr. Bruce believes that small subcutaneous injections of such serum, for three weeks or a month may produce artificial remissions of this disease. His conclusions are:

1. General paralysis is a disease directly due to poisoning by the toxins of bacteria whose point of attack is through the gastric and intestinal mucous membrane.

2. The poisoning is probably a mixed poisoning, but the bacillus coli is apparently one of the noxious organisms.

3. The result of treatment with serum, taken from a case of general paralysis in a condition of remission and injected subcutaneously into an early progressive case, points strongly to the fact that some form of serum treatment is the proper treatment for this as yet incurable disease.

Dr. Robertson, in his observations upon this subject, referring to Dr. Bruce's cases, takes the position, contrary to the opinions already cited, as to pathogenesis, that the theory of the existence of chronic toxaemia is virtually a farther elaboration of the view that the cerebral vascular lesions constitute the first anatomical alteration in general paralysis. He cites authorities defending this view and reaches the following conclusions:

General paralysis is dependent upon the occurrence of chronic toxaemia of gastro-intestinal origin; the toxins are mainly bacterial and are formed in consequence of a partial breakdown of those forces by which the harmful development of the microorganisms that constitute the ordinary flora of the alimentary tract is normally prevented; the toxins are absorbed and tend specially to produce proliferative and degenerative changes in the vessels of the central nervous system, and these vascular changes tend to set in earliest in those parts of the brain that are relatively best supplied with blood, because their walls are brought in contact with the largest quantities of toxins. The part played by syphilis in the pathogenesis of general paralysis and tabes dorsalis is essentially that of altering the natural immunity; and the treatment should be directed primarily to the correction of the disorder of the alimentary tract. Probably the only means by which it will be found possible to check the excessive growth of the gastro-intestinal bacteria is that of the employment of specific antitoxins; and to avert the disease by such means may be more practicable than would at first sight appear, because it is probable that the specially injurious toxins are the products of only a few bacterial forms.

These contributions are very interesting and are most stimulating to further researches in the direction pointed out by Dr. Bruce's work. While not yet conclusive these results are consistent with the general trend of opinion that the toxaemias are the intervening factors; and, for the present, it is along this line of research that our expectations are led. If they are verified as a substantial addition to our knowledge then we may be fairly placed on new ground in respect to mental diseases in general.

This discussion of the treatment of paresis was hardly expected, I presume, to lead to any definite conclusion; indeed the statement of the subject suggests speculative inquiry. But still

we are on firm foundations, upon the principles of bacteriology and physiological chemistry. There are several by-products of such a study as this. We are shown the limitations of pathological anatomy, that instead of expecting to find explanations of mental symptoms in terms of structure, we must seek in the deeper plane of the chemistry of nutrition explanations of both function and structure, and the changes in them. We see that the final test of all observation, hypothesis and theory, is treatment; that we who minister to the sick must apply all the needed knowledge that can be gained; that we, with our problem in the living patient, do right to exalt the clinic, for the uses of which we may claim all the contributions of expert research. It is in the arena of the clinic that the patient and the physician are the leading players in the game of life and death.

HEREDITY—WITH A STUDY OF THE STATISTICS OF THE NEW YORK STATE HOSPITALS.

By WILLIAM C. KRAUSS, M. D., Buffalo, N. Y.

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The importance of heredity in the causation of nervous and mental diseases was known and appreciated by writers on these subjects for ages, but the mode of transmissibility remains today as much of a secret as when the doctrine was first promulgated. What heredity means, its frequency, course, and favorite stigmata, have all been carefully studied, and a general knowledge of the laws governing its action is fairly well understood.

Heredity has been defined as that peculiar property of an organism which transmits to its offspring the characteristics of its progenitors. If those characteristics are ones of grace, beauty, and strength, the offspring will inherit the corresponding qualities of the parent; if, on the other hand, defect and infirmity are the characteristics of the sire, then these qualities will reappear in the young, often with renewed impetus and reinforcement. Moreover, while it is an easy matter for the higher and nobler attributes to become through custom and environment deflected and deteriorated it is almost an impossibility for the baser and decrepit qualities and conditions to become regenerated and rehabilitated.

These laws hold good not only in the human family but in the vegetable and animal worlds as well; thew follow exactly the same course and terminate at the same place. Out of propagated weakness there cannot come strength; out of defects there cannot come perfection. To me heredity is nothing more than

a mirror reflecting from one generation to another the grace, beauty, and strength, or else the coarse, ugly, defective features of the one standing before it.

There is a nomenclature in the study of this subject which it is necessary to comprehend to follow it intelligently. Heredity, when it is attributed to parents, is immediate; when it is traced from grand-parents, having skipped the parents, it is then mediate heredity. When it has existed for many prior generations it is called cumulative heredity. It may be on the side of both parents, in which case it is called double, or from convergent factors. When it is from one parent it is simply heredity, either paternal or maternal. According to Esquirol the latter is the more serious form of the two; it is also three times more common.

When hereditary insanity appears in the child at the time that it appeared in the parent it is called homochronous. When it appears in children before it is seen in the parent it is called anticipatory. When the hereditary taint reveals itself by a mental disorder identical with that of the parent it is called homologous; when it is modified in passing from one generation to another it is called dissimilar, or transformed. When it becomes more and more intensified by transmission it is said to be progressive; if it is alleviated by a series of fortunate crossings it is regressive.

The diagnostic value of a hereditary tendency to insanity depends largely on its degree. Thus the insanity of one parent would indicate a less degree of predisposition than that of one parent and an uncle, or still less than that of a parent and a grand-parent, or of both parents. Again, the insanity of a parent and a grand-parent with an uncle or an aunt in the same line may be held to indicate a stronger predisposition than even the insanity of both parents.

The significance of the insanity of parents will depend to a large extent upon the period of its onset. The insanity of a parent occurring after the birth of a child, if it arose from a cause adequate to excite it without previous predisposition, would be held, of course, as of no value in the formation of a hereditary tendency.

The insanity of relatives farther out than parents, uncles and

aunts, brothers and sisters and first cousins, is not worth anything except in corroboration of nearer and weightier facts. But the influence of other related diseases to insanity occurring in those near akin, such as eccentricity, alcoholism, epilepsy, hysteria, hypochondriasis, vicious or criminal tendencies, etc., may be of great import.

Perhaps nowhere is this doctrine of heredity more potent than in psychiatry; and in the statistics gathered and published by the different hospital systems, lunacy commissions and census reports one can gain some idea of the strength and solidity of this doctrine.

The New York State Lunacy Commission, with the large and well conducted hospitals under its supervision, is able to furnish some figures on the frequency of heredity which must carry some weight and conviction even to those who are inclined to reject the doctrine or those who believe that its importance has been overestimated. The tables quoted are taken from the Annual Report of the New York State Lunacy Commission, composed of Dr. Frederick Peterson, chairman, W. L. Parkhurst, Daniel Lockwood, Esq., and T. E. McGarr, secretary.

UTICA STATE HOSPITAL, UTICA, N. Y.

HAROLD L. PALMER, M. D., Superintendent.

Date of Opening, 1843.

Showing hereditary tendency to insanity in patients admitted during the years 1898–1899; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	8	14	22	8	9	17	185	206	391
Maternal branch.....	4	11	15	9	12	21	192	215	407
Paternal and Maternal branches.....	2	..	2	..	..	..	61	60	121
Collateral branches...	16	12	28	17	17	34	171	152	323
No hereditary tendency	91	96	187	102	66	168	638	536	1,174
Unascertained.....	32	8	40	16	15	31	1,023	755	1,778
Total.....	153	141	294	152	119	271	2,270	1,924	4,194

Total number of hereditary cases, 1898-1899, 67; 1899-1900, 72; since 1888, 1242.

Percentage showing heredity, 1898-1899, 22.7; 1899-1900, 26.5; since 1888, 29.6.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 26.3; 1899-1900, 30; since 1888, 51.4.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 70; since 1888, 48.5.

WILLARD STATE HOSPITAL, OVID, N. Y.

WM. AUSTIN MACY, M. D., Superintendent.

Date of Opening, 1869.

Showing hereditary tendency to insanity in patients admitted during 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	9	4	13	7	9	16	144	169	313
Maternal branch	11	10	21	10	17	27	199	243	442
Paternal and Maternal branches	9	1	10	1	7	8	20	45	65
Collateral branches...	23	23	46	26	14	40	246	241	487
No hereditary tendency	66	69	135	58	72	130	809	675	1,484
Unascertained.....	19	21	40	43	5	48	863	907	1,770
Total.....	128	128	265	145	124	269	2,281	2,280	4,561

Total number of hereditary cases, 1898-1899, 90; 1899-1900, 91; since 1888, 1307.

Percentage showing heredity, 1898-1899, 33.9 per cent; 1899-1900, 33.8; since 1888, 28.6 per cent.

Percentage of heredity, exclusive of unascertained cases, 1898-1899, 37.5 per cent; 1899-1900, 40.1; since 1888, 47.3 per cent.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 58.8; since 1888, 53.5.

HUDSON RIVER STATE HOSPITAL, POUGHKEEPSIE, N. Y.

CHARLES W. PILGRIM, M. D., Superintendent.

Date of Opening, 1871.

Showing hereditary tendency to insanity in patients admitted during the years 1898-1899; 1899-1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	20	18	38	30	18	48	246	212	458
Maternal branch.....	25	27	52	39	33	72	248	352	600
Paternal and Maternal branches.....	11	18	29	8	14	22	69	105	174
Collateral branches...	30	31	51	22	19	41	259	276	535
No hereditary tendency	153	125	278	129	99	228	769	775	1,544
Unascertained.....	42	32	74	44	72	116	1,714	1,383	3,097
Total.....	271	251	522	272	255	527	3,305	3,103	6,408

Total number of hereditary cases, 1898-1899, 170; 1899-1900, 183; since 1888, 1767.

Percentage showing heredity, 1898-1899, 32.5; 1899-1900, 34.7; since 1888, 27.5.

Percentage showing heredity exclusive of unascertained cases, 1898-1899, 37.9; 1899-1900, 44.5; since 1888, 53.3.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 55.4; since 1888, 46.6.

MIDDLETOWN STATE HOMEOPATHIC HOSPITAL, MIDDLETOWN, N. Y.

SELDEN H. TALCOTT, M. D., Superintendent.

Date of Opening, 1874.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	7	10	17	6	4	10	140	149	289
Maternal branch.....	9	11	20	10	18	28	176	196	372
Paternal and Maternal branches	1	..	1	1	1	2	21	20	41
Collateral branches...	7	7	14	6	8	14	107	158	265
No hereditary tendency	79	72	151	68	69	137	1,097	995	2,092
Unascertained	5	7	12	4	9	13	104	117	221
Total.....	108	107	215	95	109	204	1,645	1,635	3,280

Total number of hereditary cases, 1898-1899, 52; 1899-1900, 54; since 1888, 967.

Percentage showing heredity, 1898-1899, 24.1; 1899-1900, 26.4; since 1888, 29.4.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 25.6; 1899-1900, 28.2; since 1888, 31.6.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 71.7; since 1888, 68.7.

BUFFALO STATE HOSPITAL, BUFFALO, N. Y.

ARTHUR W. HURD, M. D., Superintendent.

Date of Opening, 1880.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	17	15	32	16	13	29	173	135	308
Maternal branch.....	24	32	56	15	18	33	156	190	346
Paternal and Maternal branches.....	1	1	2	2	4	6	16	12	28
Collateral branches...	17	29	46	18	13	31	200	298	498
No hereditary tendency	116	129	245	115	106	221	1,376	1,171	2,547
Unascertained	218	207	425	43	37	80	956	904	1,860
Total	393	413	806	209	191	400	2,877	2,710	5,587

Total number of hereditary cases, 1898-1899, 136; 1899-1900, 99; since 1888, 1180.

Percentage showing heredity, 1898-1899, 16.8; 1899-1900, 24.7; since 1888, 21.1.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 28.2; 1899-1900, 30.9; since 1888, 31.6.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 69; since 1888, 68.3.

BINGHAMTON STATE HOSPITAL, BINGHAMTON, N. Y.

CHARLES G. WAGNER, M. D., Superintendent.

Date of Opening, 1881.

Showing hereditary tendency to insanity in patients admitted during the year 1898-99; 1899-1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total	Men.	Women	Total.	Men.	Women	Total.
Paternal branch	15	16	31	17	10	27	173	133	306
Maternal branch.....	15	13	28	18	17	35	156	179	335
Paternal and Maternal branches.....	3	4	7	1	2	3	27	26	53
Collateral branches...	9	13	22	14	17	31	97	125	222
No hereditary tendency	68	77	145	86	57	143	603	587	1,190
Unascertained.....	18	7	25	16	10	26	391	285	676
Total.....	128	130	258	152	113	265	1,447	1,335	2,782

Total number of hereditary cases, 1898-1899, 88; 1899-1900, 96; since 1888, 916.

Percentage showing heredity, 1898-1899, 34.1; 1899-1900, 36.2; since 1888, 32.9.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 37.7; 1899-1900, 40.1; since 1888, 43.4.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 54.8; since 1888, 56.5.

ST. LAWRENCE STATE HOSPITAL, OGDENSBURG, N. Y.

WILLIAM MABON, M. D., Superintendent.

Date of Opening, 1890.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	23	27	50	29	22	51	233	176	409
Maternal branch	30	31	61	30	34	64	244	232	476
Paternal and Maternal branches.....	3	4	7	11	4	15	39	40	79
Collateral branches...	19	13	32	8	17	25	204	166	370
No hereditary tendency	56	59	115	57	85	142	664	631	1,295
Unascertained.....	75	20	95	77	58	135	744	567	1,311
Total.....	206	154	360	212	220	432	2,128	1,812	3,940

Total number of hereditary cases, 1898-1899, 150; 1899-1900, 155; since 1888, 1334.

Percentage showing heredity, 1898-1899, 41.6; 1899-1900, 35.8; since 1888, 33.8.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 56.6; 1899-1900, 52.1; since 1888, 50.7.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 47.8; since 1888, 49.2.

ROCHESTER STATE HOSPITAL, ROCHESTER, N. Y.

EUGENE H. HOWARD, M. D., Superintendent.

Date of Opening, 1891.

Showing hereditary tendency to insanity in patients admitted during the years 1898-1899; 1899-1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	9	8	17	12	13	25	69	86	155
Maternal branch.....	11	13	24	8	12	20	50	112	162
Paternal and Maternal branches.....	..	..	..	1	2	3	6	5	11
Collateral branches...	18	12	30	13	7	20	98	91	189
No hereditary tendency	50	44	94	64	67	131	370	436	806
Unascertained.....	22	28	50	7	9	16	331	229	560
Total.....	110	105	215	105	110	215	924	959	1,883

Total number of hereditary cases, 1898-1899, 71; 1899-1900, 68; since 1888, 515.

Percentage showing heredity, 1898-1899, 33; 1899-1900, 31.6; since 1888, 27.4.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 43; 1899-1900, 34.1; since 1888, 39.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 65.8; since 1888, 60.9.

LONG ISLAND STATE HOSPITAL, BROOKLYN, N. Y.

O. M. DEWING, M. D., Superintendent.

Date of Opening, 1895.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	12	29	41	15	21	36	145	193	338
Maternal branch.....	29	24	53	25	14	39	184	204	388
Paternal and Maternal branches	3	3	6	2	2	4	28	45	73
Collateral branches...	28	14	42	30	21	51	205	250	455
No hereditary tendency	127	126	253	143	158	301	1,405	1,176	2,581
Unascertained.....	147	140	287	162	146	308	1,909	2,236	4,145
Total.....	346	336	682	377	362	739	3,876	4,104	7,980

Total number of hereditary cases, 1898-1899, 142; 1899-1900, 130; since 1888, 1254.

Percentage showing heredity, 1898-1899, 20.8; 1899-1900, 17.5; since 1888, 15.7.

Percentage showing heredity, exclusive of unascertained cases 1898-1899, 35.9; 1899-1900, 33.9; since 1888, 32.6.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 69.5; since 1888, 67.3.

MANHATTAN STATE HOSPITAL, EAST, NEW YORK, N. Y.

A. E. MACDONALD, M. D., Superintendent.

Date of Opening, 1896.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending Sep. 30, 1900.	Since Oct. 1, 1888.
	Men.	Women	Total.	Men.	Men.
Paternal branch	16	32	48	23	315
Maternal branch	14	38	52	19	277
Paternal and Maternal branches	..	4	4	5	40
Collateral branches	59	51	110	43	472
No hereditary tendency	511	564	1,075	544	5,419
Unascertained	46	35	81	37	2,020
Total	646	724	1,370	671	9,143

Total number of hereditary cases, 1898-1899, 214; 1899-1900 (men only), 90; since 1888, 2332.

Percentage showing heredity, 1898-1899, 15.6; 1899-1900, 13.4; since 1888, 13.1.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 16.6; 1899-1900, 14.2; since 1888, 18.1.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 82.7; since 1888, 75.9.

MANHATTAN STATE HOSPITAL, WEST, NEW YORK, N. Y.

E. C. DENT, M. D., Superintendent.

Date of Opening, 1898.

Showing hereditary tendency to insanity in patients admitted during the years 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.
Paternal branch	3	33	36	3	222	225
Maternal branch	1	44	45	1	327	328
Paternal and Maternal branches	..	2	2	..	16	16
Collateral branches	3	30	33	3	772	775
No hereditary tendency	75	621	696	75	5,859	5,934
Unascertained	118	62	180	118	2,206	2,324
Total	200	792	992	200	9,402	9,602

Total number of hereditary cases, 1899-1900, 116; since 1888, 1344.

Percentage showing heredity, 1899-1900, 11.7; since 1888, 14.

Percentage showing heredity, exclusive of unascertained cases, 1899-1900, 14.1; since 1888, 18.6.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 85.7; since 1888, 81.5.

GOWANDA STATE HOSPITAL, GOWANDA, N. Y.

DANIEL H. ARTHUR, M. D., Superintendent.

Date of Opening, 1898.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch	8	19	27	3	2	5	18	21	39
Maternal branch	9	21	30	3	4	7	16	25	41
Paternal and Maternal branches	2	..	2	1	..	1	5	..	5
Collateral branches	10	26	36	3	6	9	18	32	50
No hereditary tendency	23	82	105	23	16	39	81	98	179
Unascertained	25	29	54	7	9	16	81	37	118
Total	77	177	254	40	37	77	219	213	432

Total number of hereditary cases, 1898-1899, 95; 1899-1900, 22; since 1888, 135.

Percentage showing heredity, 1898-1899, 37.4; 1899-1900, 28.5; since 1888, 31.2.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 47.5; 1899-1900, 36; since 1888, 42.9.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 63.9; since 1888, 57.

MATTEAWAN STATE HOSPITAL, MATTEAWAN, N. Y.

H. E. ALLISON, M. D., Superintendent.

Hospital for Insane Convicts.

Date of Opening, Auburn, 1859; Matteawan, 1892.

Showing hereditary tendency to insanity in patients admitted during the years 1898–99; 1899–1900, *and since October* 1, 1888.

	Year ending September 30, 1899.			Year ending September 30, 1900.			Since October 1, 1888.		
	Men.	Women	Total.	Men.	Women	Total.	Men.	Women	Total.
Paternal branch.....	3	1	4	6	..	6	55	7	62
Maternal branch.....	7	1	8	8	2	10	79	8	87
Paternal and Maternal branches.....	..	..	..	..	..	..	13	..	13
Collateral branches...	8	1	9	10	..	10	67	2	69
No hereditary tendency	..	..	..	8	..	8	168	13	181
Unascertained.....	109	7	116	120	14	134	993	60	1,053
Total.....	127	10	137	152	16	168	1,375	90	1,465

Total number of hereditary cases, 1898-1899, 21; 1899-1900, 26; since 1888, 231.

Percentage showing heredity, 1898-1899, 15.3; 1899-1900, 15.4; since 1888, 15.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 100; 1899-1900, 76.4; since 1888, 56.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 23.2; since 1888, 43.9.

RECAPITULATION.

Institutions.	1895-1896. Percentage showing heredity, exclusive of unascertained cases.	1898-1899. Percentage of whole number showing heredity.	1898-1899. Percentage showing heredity, exclusive of unascertained cases.
Utica State Hospital.....	43.	22.7	26.3
Willard State Hospital.....	51.3	31.6	37.5
Hudson River State Hospital..	35.8	32.5	37.9
Middletown State Hospital....	37.1	24.1	25.6
Buffalo State Hospital.....	28.1	16.8	28.2
Binghamton State Hospital...	34.1	34.1	37.7
St. Lawrence State Hospital...	52.6	41.6	56.6
Rochester State Hospital.....	48.9	33.	43.
Long Island State Hospital ...	26.9	20.8	35.9
Manhattan State Hospital.....	17.3	15.6	16.6
Gowanda State Hospital	....	37.4	47.5
Matteawan State Hospital	57.1	15.3	100.

Percentage of whole number, showing hereditary tendency, exclusive of unascertained cases, for the year 1895-1896, 39.2.

Percentage showing heredity, 1898-1899, 27.1; since 1888, 24.5.

Percentage showing heredity, exclusive of unascertained cases, 1898-1899, 41; since 1888, 41.1.

Total number of cases admitted, 1898-1899, 5369; since 1888, 54,876.

Total number of hereditary cases, 1898-1899, 1287; since 1888, 12,000.

RECAPITULATION.

Showing percentage of heredity of the thirteen State Hospitals for the year 1899-1900, *and since October* 1, 1888.

Institutions.	1899-1900.			Since October 1, 1888.		
	Heredity of whole number.	Exclusive of unascertained.	No heredity, exclusive of unascertained.	Heredity of whole number.	Exclusive of unascertained.	No heredity, exclusive of unascertained.
Utica S. H.....	26.5	30.	70.	29.6	51.4	48.5
Willard S. H.....	33.8	41.1	58.8	28.6	46.8	53.5
Hudson River S. H....	34.7	44.5	55.4	27.5	53.3	46.6
Middletown S. H.....	26.4	28.2	71.7	29.4	31.6	68.7
Buffalo S. H.....	24.7	30.9	69.	21.1	31.6	68.3
Binghamton S. H	36.2	40.1	59.8	32.9	43.4	56.5
St. Lawrence S. H	35.8	52.1	47.8	33.8	50.7	49.2
Rochester S. H.....	31.6	34.1	65.8	27.4	39.	60.9
Long Island S. H	17.5	33.9	69.	15.7	32.6	67.3
Manhattan S. H. East.	13.4	14.2	82.7	13.1	18.1	75.9
Manhattan S. H. West.	11.7	14.1	85.7	14.	18.6	81.5
Gowanda S. H.....	28.5	36.	63.9	31.2	42.9	57.
Matteawan S. H.....	15.4	76.4	23.2	15.	56.	43.9

Percentage showing heredity, 1899-1900, 25.8; since 1888, 24.5.

Percentage showing heredity, exclusive of unascertained cases, 1899-1900, 36.6; since 1888, 39.7.

Percentage showing no hereditary tendency, exclusive of unascertained cases, 1899-1900, 63.3; since 1888, 59.8.

Total number of cases admitted, 1899-1900, 6361; since 1888, 61,257.

Total number of hereditary cases, 1899-1900, 1202; since 1888, 14,526.

The hospital showing the highest percentage of heredity of the whole number for the year 1895-1896 was the Matteawan Hospital with a percentage of 57.1; for the year 1898-1899, the St. Lawrence Hospital with a percentage of 41.6; for the year 1899-1900, the Binghamton Hospital with a percentage of 36.2; and since 1888, the St. Lawrence Hospital with a percentage of 33.8.

Exclusive of the unascertained cases the St. Lawrence Hospital showed the highest percentage for the year 1898-1899, with 56.6; for the year 1899-1900, the Matteawan Hospital with a percentage of 76.4; and since 1888, the Matteawan Hospital with a percentage of 76.4.

The lowest percentage of heredity for the year 1895-1896 was shown by the Manhattan State Hospital with a percentage of 17.3; 1898-1899, the Matteawan Hospital with a percentage of 15.3; 1899-1900, the Manhattan Hospital, West, with a percentage of 11.7; and since 1888, the Manhattan Hospital, East, with a percentage of 13.1.

Exclusive of the unascertained cases the Manhattan Hospital showed the lowest percentage for the year 1898-1899; the Manhattan Hospital, West, for the year 1899-1900, with a percentage of 14.1; and since 1888, the Manhattan Hospital, East, with a percentage of 18.1.

These percentages vary of course from year to year and the percentage of the whole number since 1888, as 39.7, is perhaps as correct an index of the true percentage as it is possible to determine.

In the census returns of 1890, of 70,340 insane studied with reference to heredity, 22,077, or 31.38 per cent, had insane relatives; the number having insane fathers was 2531, insane mothers 3159; insane grandfathers 784, insane grandmothers 810;

insane uncles 2408, insane aunts 2034; insane brothers 3630, insane sisters 3704; insane sons 465, insane daughters 480 (Kellogg).[1]

The transmission of heredity through the maternal branch is greater than through the paternal, being 372, as compared with 335 for the year 1895-1896; 420 to 340 for the year 1898-1899; 450 to 329 for the year 1899-1900 and 4261 to 3608, since 1888.

In the 1890 census report the ratio of the insane having insane relatives was greater among the females (337 per 1000) than among the males (289 per 1000). These figures are not so high as Esquirol's, who claimed that maternal transmissibility was three times more common and much more serious than hereditary transmission through the father. Baillarger noted in 453 cases of alienation with antecedent heredity that maternal transmission occurred 271 times, while paternal transmission occurred 182 times.

It is a noteworthy fact that the reports of the New York State Hospital show that *maternal* transmission is increasing rapidly over *paternal* transmission as shown by comparison of the figures given for the years 1895-1896 and 1899-1900.

Turning now to nervous diseases proper, we find heredity just as strongly represented in the various neuroses as was found for the psychoses,—there is transmitted in the organism certain diatheses which favor certain diseases, such as Huntington's chorea, Friedreich's disease, running through successive generations. These diseases are termed hereditary, familial, embryonic, and this succession is what is meant by the term direct heredity or organic heredity. The severity of the heritage depends very largely upon the number of members and branches affected. Here again, as in the study of psychotic heredity, we find that maternal transmissibility far exceeds the paternal.

Indirect heredity is heredity by transformation from other neuropsychic diseases and is more common but of less consequence than direct heredity. Given a neuron feebly endowed with en-

[1] Text-Book of Mental Diseases, 1897.

I have been unable to obtain the census report of 1900, relating to the insane.

during qualities, it is not improbable that any condition capable of reducing the general health may act with unusual virulence upon it. The result is a neuropathic disposition, or a nervous organization with a tendency to yield readily to undue strains and unusual influences, though of themselves of no material importance. There is propagated from parent to offspring certain diatheses which favor certain neuropathic equivalents. Thus epilepsy, melancholia or inebriety, may favor the production of hysteria, chorea, or neurasthenia in the succeeding generations; the transformation of the neuroses and toxic diatheses in propagation result often in imbecility. Thus the children of hysteric, epileptic, hypochondriac and syphilitic or alcoholic parents are liable to be imbecile. Phthisical parents also frequently beget imbecile children.

In the progressive degeneracy which leads to the extinction of families, imbecility is the next to the final stage, which ends with idiotic incapacity of reproduction (Kellogg).

There is thus nurtured a family tree whose branches become heavily laden with neuropathic fruit, yielding and bending to the slightest zephyr, until through sterility it becomes barren and lifeless and falls by the wayside in the struggle for existence.

The following tables show approximately the diseases of the nervous system arranged according to their hereditary tendency and also those which authorities are agreed do not belong to this category. The hereditary neuroses are divided into those of direct and indirect transmissibility.

Direct Heredity.

Amyotrophic lateral sclerosis.
Aneurism, intracranial.
Angioneurotic œdema.
Apoplexy, cerebral.
Astasia abasia.
Chorea, Huntington's.
Cretinism.
Epilepsy.
Exophthalmic goitre.
Hemiatrophia facialis.
Hereditary amaurotic idiocy.
Hereditary ataxic paraplegia.
Hereditary cerebellar ataxia.

Hereditary cerebral diplegia.
Hereditary hemiplegia.
Hereditary spastic paraplegia.
Hypochondriasis.
Hysteria.
Little's disease.
Meningitis, tuberculous.
Migraine.
Muscular atrophy (Charcot-Tooth).
Muscular dystrophy (Landouy-Dejerine and Erb types).
Muscular hypertrophy, pseudo.
Neuromata,
  true,
  multiple,
  plexiform.
Paralysis agitans.
Poliomyelitis, acute anterior.
Sclerosis, multiple.
Spina bifida.
Thomsen's disease.
Torticollis.
Tumors, cerebral.

INDIRECT HEREDITY.

Adiposis dolorosa.
Amyotrophic lateral sclerosis.
Bulbar paralysis, progressive.
Chorea, Sydenham's.
Copralalia.
Exophthalmic goitre.
Hydrocephalus, chronic.
Hypochondriasis.
Hysteria.
Laryngismus stridulus.
Locomotor ataxia.
Muscular atrophy (Duchenne-Aran).
Myelitis, acute transverse.
Neuralgias.
Neurasthenia.
Neuritis.
Occupation neuroses.
Paramyoclonus multiplex.
Paresis.
Raynaud's disease.
Saltatory spasm.
Scleroderma.

Sclerosis, multiple.
Spasm, facial.
Spasm, habit.
Syphilis, cerebral.
Torticollis.

No Heredity.

Abscess, cerebral.
Acromegaly.
Anemia, cerebral.
Bell's palsy.
Brown-Séquard's paralysis.
Bulbar paralysis, asthenic.
Caisson disease.
Chorea, electrical; Dubnin's disease.
Eclampsia infantum.
Embolism, cerebral.
Encephalitis, acute hemorrhagic.
Erythromelalgia.
Hematomyelia.
Hematorrhachis.
Herpes Zoster.
Hyperemia, cerebral.
Hyperostosis cranii.
Landry's paralysis.
Leptomeningitis acuta.
Leptomeningitis chronica.
Menière's disease.
Meningitis, alcoholic, serous.
Meningitis, epidermic cerebrospinal.
Morvan's disease.
Muscular atrophy, arthritic.
Muscular atrophy, occupation.
Myelitis, chronic.
Myxedema.
Ophthalmoplegia, progressive.
Pachymeningitis cervicali hypertrophica.
Pachymeningitis hemorrhagica interna.
Poliomyelitis acuta adultorum.
Rabies.
Sclerosis, combined with anemia.
Syringomyelia.
Tetanus.
Tetany.
Thrombosis, cerebral.
Tumors, cerebral.
Tumors, spinal.

371 Delaware ave.

SENILITY AND SENILE DEMENTIA.[1]

By WILLIAM L. RUSSELL, M. D.,

First Assistant Physician, Willard State Hospital, Willard, N. Y.

"Were we to attempt to define the boundary betwixt the physiological and pathological forms of senility, between the ordinary second childishness of old age, and the dementia resulting from the senile atrophy of disease, we should find the task a difficult if not impossible one." This quotation from Bevan Lewis indicates the difficulties in diagnosis met with in many aged cases presented for admission to the public hospitals for the insane. It indicates also the difficulty of the task undertaken by the writer, in attempting to bring before you some considerations which it is hoped will at least afford the basis for a discussion, which may assist in elucidating a question which is demanding solution, not only in this state and country, but in other states and countries as well. As the horror and prejudice which have prevailed for ages in reference to insanity and institutions for the insane become replaced by feelings more consistent with humanity and intelligence, and as the knowledge of the improved character of these institutions becomes more and more diffused, there is observed an inclination to send more and more persons to them. Instead of being regarded as last resorts in desperate cases, the ministrations which they offer to diseased minds are now frequently sought after for those who would formerly not have been considered for a moment to be in need of such. The result is that the number of old people admitted is increasing from year to year. This increase has attracted considerable attention elsewhere, although at this hospital it has not become sufficiently great to be noteworthy. During the past ten years 644 of 2738 persons, admitted to the hospital by original commitment, have

[1] Read at a meeting of the Willard State Hospital Medical Society November 14, 1900.

been over sixty years of age. The percentage is about 23. During the two years last past, however, the percentages have been 25.2 and 24.8 for each year respectively. This increase, while not large, is of such a nature as to lead to a desire for a more definite understanding of the distinction between normal and abnormal senility.

It will not be possible to consider this subject very extensively in the compass of a short paper, and I shall attempt only to describe fully a few of the principal characteristics of normal senility and to present such points in reference to senile dementia as seem to me of special value in diagnosis.

If the organs and tissues of the aged be compared with those of healthy adults, marked differences will be observed.

The changes are similar to or identical with those seen sometimes as the effect of disease, and are almost invariably accompanied by lesions which must be regarded as strictly pathological, for entirely normal senility and death from such are rarely if ever met with. So marked are the changes, that some medical writers go so far as to regard the whole process as pathological, and speak of old age itself as though it were a disease. Senility, with its structural and functional changes is, however, a phenomenon observed throughout all animal nature, as a phase of existence. It belongs to the higher as to the lower forms of life, and to the animal as to the vegetable kingdom; and however complex the life of man may be, and however high his endowments above those of the rest of nature, in this he must share the destiny of the humblest. Admitting then as unnecessary of demonstration the fact of senility as an inevitable phase of man's existence on earth, it becomes desirable to define if possible a standard which may represent the normal. It is difficult to define a standard of health and sanity for any age, and the difficulties are enhanced in old age, by the similarity of the changes due to senility to those caused by disease,—yet practically we act as though there *was* an established standard by which to judge every individual. We speak of certain appearances and certain mental characteristics as peculiar to certain ages, as the phrases "an old fashioned child," and "second childhood" indicate. Still it must not be expected that a fixed and unquestionable standard of senility can be demonstrated.

All of life is a transition, one phase passing into another, and often health into disease, by imperceptible gradations. The grosser signs of senility are familar to all, yet it is not possible to tell just when the process of which they are the signs began. There is, too, no definite age limit of which it can be said that before this has been reached none of these signs will appear, and after it, all of them will always be present.

Senility, then, is a term applied not so much to any particular age as to a condition of the organism. Experience teaches, however, that this condition, at least as it pertains to the whole organism, is not seen in the average man before a certain age, and we have thus come to establish in our minds an age standard which is sufficient for all ordinary purposes. The condition of the organism which indicates senility may be briefly described by the term atrophy, and as according to Charcot normal man begins to lose weight steadily at the age of sixty, we may accept this as the beginning of old age. Some few localized signs of senility will have appeared in the average man before this age, but his functions will have been scarcely disturbed. Now, however, begins the age which " shifts into the lean and slippered pantaloon," and however sound and healthy the organism may be, changes have begun which are progressive and inevitable. The most conspicuous marks of these changes are an increasing deliberation and uncertainty in movement, a diminishing elasticity of step, a lessening power of ready adaptation in the organs of sense, and a retardation in the mental processes. Eventually appears the emaciated and bowed form, the weakened and shrunken muscles, the stiffened joints; the dry, wrinkled, and lusterless skin, the thin grey locks, the faded eye, and the irresponsive and clouded mind. The loss of weight referred to affects all parts of the body, including all the internal organs except the heart and kidneys, the former of which is indeed often hypertrophied. The brain, the spinal cord and nerve trunks, the lungs, the liver, in fact all the blood-making organs, and especially the spleen and lymphatic glands all share in the general wasting. Microscopic investigation shows the wasting to be the result of a simple process of atrophy. In this, the cellular elements become lessened in volume and number without at first essential modification in structure. The more highly differentiated tissues are first affected,

the less differentiated connective tissue in the meantime replacing the nobler elements, and this gradually changing into fibrous tissue. Thus is produced the condition of sclerosis which is so characteristic of senility, and to which is due that general shrinking and hardening of all the tissues which has been well characterized by Dr. Richardson as indicating a declining resistance to the attractive power of the earth. Sclerotic changes in the walls of the blood vessels tend to impair the nutrition and vigor of the parts supplied by them, and this impairment is increased by the fatty, pigmentary and calcareous degenerations which finally appear. Atrophic and degenerative changes are especially conspicuous in the brain, the chemical composition of which is also modified, the fatty materials suffering diminution and the phosphorus and water being increased. Side by side with the progressive tissue changes, may be observed alterations in function.

The characteristic of these is retardation. The precise moment when this begins is not discoverable, and when noticed, the subject has already passed through several stages of senilization. Retardation in movement has already been noted. This is eventually followed by that marked muscular enfeeblement which, with enfeeblement of the generative mechanism, is one of the most characteristic features of senility. The respiratory movements are weakened in old age, the respirations are increased in frequency and the capacity of the lungs is diminished. Modification of the cardiac function is not usually prominent, but acceleration of the pulse rate from disease is of greater significance in the aged, as the heart tires more easily. Most of the secretions are diminished, especially the sweat and urine, and the latter is easily altered by disturbance in any part of the organism. As a result of the lowered nutrition and wasting of the gastrointestinal mucous membrane, diminution of the digestive secretions is present, and the function of digestion is more feebly performed.

Metabolism is also retarded, as the special tendency to gout and rheumatism, which the aged present, bears witness. The special senses, especially sight and hearing, become imperfect, and the activity of the whole nervous system shows signs of marked impairment. Dr. Richardson suggests that this impairment may be the primary cause of all other failures, as, in early life, parts imperfectly supplied with nervous energy grow prematurely old. Sensibility is blunted and nervous reaction retarded.

The structural changes in the brain and the impairment in the general functions of the nervous system just referred to would seem to render necessary some alteration in the mind as a result of senility. This invariably occurs, though the extent of the alteration is subject to wide variations. Retardation which, as already noted, is the prevailing characteristic of the bodily functions of the aged, is the mark of the senile mind also.

It appears in the slowness in apprehension of impressions conveyed by the senses, in greater deliberation in judgment, and in hesitation and lack of energy in speech and action. These are generally regarded as evidences of sagacious deliberation rather than failing powers, and it is only when memory is noticed to be at fault that mental deterioration is recognized. This failure of memory pertains nearly entirely to recent events, to proper names, and to the less frequently used nouns. Remote events are remembered with great vividness and accuracy. This is just the reverse of what occurs in the earlier periods of healthy life, but is readily accounted for by the feebler impressions made upon the brain of the subject of senility, and the consequent lack of attention and interest. The senile mind is unable to acquire new facts readily, or to assimilate new experiences and ideas. Dependent thus, to a great extent upon the past, the man becomes more and more conservative, is guided by precedent rather than judgment, becomes stereotyped in his habits, and takes less and less interest in the occurrences about him, considering what he sees, hears, and reads, merely a repetition of what he has experienced before. His associations become diminished in extent and variety and his thoughts and speech become simpler and simpler. He loses the thoughtfulness and foresight in speech and action which may have characterized his earlier years and is liable to lapse into imprudences unexpectedly. In conversation he dwells at great length on details, with frequent repetitions, with absence of emphasis on important features, and without definite connection between the parts of his discourse, often, in fact, rambling entirely away from his subject. The subject of these changes may or may not be conscious of his failing mental powers, this depending largely on the degree of his self-consciousness and his habits in reference to self-examination.

Alterations in the ethical sense and moral tone are usually

present in the aged. There is frequently deterioration in manners, slovenliness in dress and a disregard of appearances which may amount to indifference to the requirements of decency. A failure in moral courage and moral enthusiasm is noticed. There is lack of self-control manifested by peevishness, querulousness, obstinate self-opinion and dictatorial self-will. Avarice, selfishness, and pessimism have also been always attributed to old age.

Senility once begun is progressive and eventually its subject becomes so trivial and simple in thought, word, and deed, and reveals such lack of self-control and consideration in conduct that he sinks into veritable second childishness.

As already intimated, the age at which the signs of senility first appear, the rapidity and uniformity with which the changes in the different tissues and functions progress, and the degree they reach are subject to wide variations. In the average case, however, the age of sixty may be accepted as a standard, and the changes in the tissues should progress with uniformity of degree and rapidity, and the alterations in function should be indicated by the anatomical changes discoverable.

It would not be hard to cite cases to prove that any one, several, or perhaps nearly all of the marks of senility which have been referred to, whether physical or mental, may be wanting in normal old age. In reply to this it may be said that such instances while of assistance in arriving at a standard, must be considered as ideals or types of the possible, rather than as examples of the average. It may be that a time will come when every human being will be of such a type, but at present old age unhampered by hereditary or acquired tendencies to disease, and unmodified by accidental circumstances, is the exception, not the rule.

The causes of this are manifold, involving as they do, inheritance, education, habits, character, environment, and many more or less accidental circumstances to which all are liable.

Two of the most important influences which cause senility to take on pathological features are temperament and diathesis.

Temperament has been defined as "all that which concerns the individual variations of nutritive activities," and diathesis as "the disposition to disease." Illustrative examples are the

"bilious" temperament and the "arthritic" or "gouty" diathesis. On these depend largely the variations in resistance which each organ and tissue offers to the senile process. Their influence may be increased by various acquired causes or these latter may themselves promote senility. Among the most prominent of these are infections, especially syphilis, but also tuberculosis and fevers, such as typhoid or grippe; toxic agents such as alcohol, which affects principally the nerve elements; lead which has a predilection for the blood corpuscles, the muscles and nerves; also phosphorus and mercury, and poisons resulting from excesses in diet. The effect of the operation of these and other causes, are premature appearance, or irregularity and undue rapidity in the progress of the senile process in different organs or tissues, and the development of definite pathological lesions and alteration of function.

When the nervous system is the part of the organism in which this exaggeration or modification is affected, the pathological condition to which the name of senile dementia has been given may result. Bevan Lewis lays particular stress on the necessity of recognizing the special tendency towards atrophy in morbid changes in the nervous system of the aged, and he considers senile dementia to be dependent on this process which has been set up by some special cause inherited or acquired. The aged are liable to other forms of insanity such as mania, and melancholia, and mental disorders dependent upon gross organic brain lesions, but as these, though modified by the senile process, are not liable to give rise to much confusion in diagnosis, they will not receive further attention in this paper. Senile dementia, however, presents symptoms which differ from those of normal senility principally in degree, and as already stated it is impossible to define the dividing line. Strictly speaking, it may perhaps be claimed that any departure from the highest type is abnormal. This may be true theoretically, but when one considers the differences in mental and physical types at all ages and in different states of civilization and intelligence, it ceases to be a practical proposition. A marked departure from the average, however, is abnormal, and it is evidence of this which should be sought for. For this reason it seems advisable to make as complete a survey as possible of all the facts obtainable in any particular case before deciding.

Special importance would seem to attach to the presence or absence of any inherited or acquired conditions which would tend to produce premature senility or modify the senile process in the nervous system, particularly, so as to render it pathological. Bevan Lewis found an inherited predisposition to insanity in 22 per cent of 261 cases of senile dementia, and in 26.4 per cent when the neuroses were also included. This he considers a fairly average predisposition in view of the scanty data, as the facts about heredity are farther back and more forgotten than in any other form of insanity.

The previous history of the patient so far as it can be learned, may also be of assistance. Excessive alcoholic indulgence lends a frightful impetus to the retrogade changes of old age, tending to over-excitation and exhaustion of the nerve-cells, and while the habit may have been abandoned some time before, the effects may have been irremediable. The habits of the patient are therefore of great importance. One third of 54 male senile cases admitted to this hospital had an alcoholic history. The causative effect of other toxic agents than alcohol, such as narcotics or lead, or those due to diet, should also not be forgotten. Infections such as syphilis or recent fevers may be found to have some relation to the mental condition present, as may also exhaustion from privation, undue exertion or emotional strain.

A history of the beginnings of the mental failure may be of value. Lewis says that there are some cases of senile dementia in which the onset is so marked, or so sudden, or so premature that no doubt can be entertained that the physiological barrier has been over-stepped. These cases are exceptional to be sure, but such a history, if discovered, would be of great assistance.

The constant aim in examining a patient is to separate the pathological from the physiological. A careful physical examination is therefore essential, as evidences of definite pathological lesions in any part of the body are suggestive at least of a pathological basis for mental symptoms. This is especially true of conditions which profoundly affect nutrition, such as marked digestive disorders and circulatory diseases, and of those which may also present a toxic element such as diabetes mellitus, nephritis, syphilis, tuberculosis, and malignant tumors. The genital organs or the rectum may also present conditions which may assist in arriving at a correct conclusion.

All the physical possibilities should therefore be questioned. The physical signs of senility should also receive consideration with a view of determining the relation between the general senile process and the mental condition present. Marked premature senility must always be considered as abnormal, and if the mental deterioration is decidedly more advanced than that of the organism generally, it is presumptive evidence that there is some pathological condition present on which it depends.

Owing to the limits of the paper it has not seemed best to refer at length to the symptoms of senile dementia, especially as the difficult cases are those in which there is a simple exaggeration of the mental phenomena of normal senility, which have been already described. When hallucinations or fixed delusions are discoverable there will rarely be any difference of opinion. Other irregularities, however, which do not properly belong to normal senility are not so generally considered, but ought not to be neglected. Slight degrees of exaltation and restlessness may be noticed, or degraded, filthy habits, erotic tendencies, or destructiveness, and marked perversity in conduct. Insomnia, too, may be present to a degree that can not fail to be significant of disease. All these and any other evidences of pathological conditions which may be suggestive should be carefully inquired into. It may be thought that, after all, the diagnosis has to be made upon the mental condition as it appears to the examiner in conversation with the patient, and upon the representation of the friends and others familiar with the case. This is true in a measure, but on the other hand it seems to me that the most secure and most scientific position to assume is that when the evidence indicates that the mental deterioration is due to a disease process, the patient should be admitted to the hospital, and there is no way of discovering this evidence except by examining into all the facts. The decision should be based upon the whole story of the case, not on one portion of it only.

SOME OBSERVATIONS UPON THE ELIMINATION OF INDICAN, ACETONE AND DIACETIC ACID IN VARIOUS PSYCHOSES.

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Of the various coloring matters of the urine, the greatest importance is attached to the indigo group which is eliminated in the colorless combination as indoxyl-sulphuric or indoxyl-glycuronic acid. Being as it is one of the paired end products of intestinal putrefaction, there is a direct relation and parallelism between the amount of indol produced in the small intestine, which is a measure of albuminous decomposition, and the amount of indican eliminated in the urine. Indican is seldom absent from the urine, but, when eliminated in large amounts, it must, like acetone, aceto-acetic and B-oxybutyric acids, be taken as an index of abnormal retrograde metabolism. That it is the end product of intestinal putrefaction, and can serve as a measure of the amount of the same, has been proven beyond doubt. The principal aromatic end substance of proteid decomposition is indol, and, where this can be excluded or controlled, as in laboratory experiments by the addition of thymol or chloroform, little or no indol is produced. Senator[1] did not find indican in the urine of the newly born or in the meconium. Baumann[2] succeeded in absolutely disinfecting the intestinal canal of a dog by means of large doses of calomel and observed that all traces of indican, as well as kresol and para-kresol, disappeared from the urine. Diet can also have its influence, for if we give fats and carbohydrates, and exclude proteids (excepting milk), we can greatly diminish the amount of indican, not, however, to complete absence, for there will always remain the breaking down of the protein of the living cell. Gelatin does not produce indol, but yields the amido-acids instead, because its molecule does not contain the indol group.

Experimentally, large amounts of indigo substances have been shown to appear in the urine after tying off or occlusion of the small intestine, but not of the colon. Clinically, this has been of great importance in the diagnosis of ileus. That tryptic digestion is most favorable to the bacterial decomposition of albumin, has been established by the Italian investigators. Pisenti[3] ligated the pancreatic duct in dogs and showed in two cases that this caused a marked reduction of the indican. Stefanni[4] reported a case of suppurative pancreatitis in which indican was absent. Biondi[5] also gives a case of pancreatic adenoma in which there was no indican. Harnack[6] showed that indicanuria can be produced by poisoning with dilute sulphuric acid and also by the introduction of oxalic acid per os. In the former case, it requires larger doses and the indicanuria is much less permanent. In order to produce it by oxalic acid it is better to introduce it subcutaneously in the form of its neutral sodium salt. Relatively small amounts are sufficient, that is, in doses generally conceded as non-toxic. Paralleled with the investigations of Harnack, Wesener[7] states that when food rich in oxalates can be excluded, the presence of large amounts of oxalic acid in the urine suggests gastro-intestinal fermentation and often indicanuria is associated with oxalic crystals, both being the products of proteid putrefaction. I cannot, however, agree with the author, since, within the last year, both Helen Baldwin[8] and Austin[9] have shown the origin of oxalic acid either from the fermentation of carbohydrates, or from the carbohydrate group in the albumins. Indican may also be increased by the introduction of orthonitrophenyl propionic acid[10]. From Müller's observations on Cetti[11] we learn that during starvation indican rapidly decreased and after the third day it had entirely disappeared. Tuczek has also observed the disappearance of indican in two cases in which there was absolute abstinence from food. To this last observation, we will return later. Jaffé[12] showed that after the subcutaneous injection of indol or after its administration by the stomach, the combined indoxyl compound appears richly in the urine. Experiments on the toxic qualities of indol have been made by various observers. Nencki[13] found that no effect was produced by giving a dog 1 gramme of indol in 24 hours, but after 2 grammes had been administered, there developed diarrhea and hematuria. Baumann

and Brieger,[14] on the contrary, observed no toxic symptoms after giving much larger doses. Christiani[15] found, that in frogs who had been dipped in solutions of indol of a strength of 0.010 grammes to 100 cc. water, there was produced increased reflex irritability and slight transient paralysis. When stronger solutions were used, the paralysis became more manifest, tremor developed and finally death after 24 hours. Rovighi[16] observed that in rabbits indol and skatol produced torpor, somnolence, general paresis, feeble heart action and a reduction in temperature. The latest contribution to the toxic properties of indol has been made by C. A. Herter[17]. He experimented with acute and chronic indol poisoning in rabbits, dogs and man. In rabbits and dogs, the injection of indol solutions into either the intestine or large femoral vein produced invariably cardiac and respiratory depression, marked contraction of the pupils, muscular twitchings, irregular clonic spasms and increased reflex excitability. The quantities injected varied from 30 to 92 cc. of a 0.1 per cent solution. In three observations on rabbits which received 10 cc. daily of a 0.1 per cent solution for periods varying from 13 to 22 days, there were profound disturbances of nutrition, rapid loss in weight in spite of the ingestion of food (amounting in the 3 cases to 23 per cent, 21 per cent and 37 per cent of the body weight), prostration and greatly diminished activity. The pathological changes found were chiefly in the liver and consisted in the capillaries of the lobules being much congested, while the liver cells were the seat of degeneration and pigmentation. In contradistinction to the above, a small ring-tail monkey received 5 cc. of a 0.1 per cent solution daily for 2 months without apparent effect. Experiments were also performed on 3 healthy men, who were given three times daily after meals, 0.1 gramme indol, in gelatin capsules, for periods varying from 5 to 9 days. The chief symptoms were frontal and occipital headache, colic, diarrhea, insomnia, lassitude, increased knee-jerk, disturbed sleep, dull sensations in the head and inability to work. These symptoms disappeared after the indol was discontinued. During the administration, the urine gave a strong indican reaction and the ratio of the preformed to the combined sulphates showed a marked decrease. The following data are obtained referring to the occurrence of indican in various nervous and mental

disorders. M. Allen Starr[18] makes a statement concerning the occasional occurrence of large quantities of indican or indoxyl in the urine, in cases with a sensation of pain and fulness in the head and various vaso-motor disturbances. In psychoses due to gastro-intestinal auto-intoxication, Wagner von Jaurreg[19] finds in the urine, in addition to acetone and diacetic acid, considerable amounts of indican. In this same connection, Régis[20] points out the occurrence of more or less considerable quantities of indican, acetone, diacetic and B-oxybutyric acids, tyrosin and the conjugate sulphates. Berkley[21] also remarks on the excess of indican and skatol in melancholia, in neurasthenia and in mania, especially in the latter where there is any implication of the gastro-intestinal tract. Wolowski[22] makes the claim that in many diseases indican is the sole cause. He found indicanuria in a case of epilepsy and also in numerous nervous diseases, particularly the neuroses, and as the disease improved, the indican more or less completely disappeared from the urine. Rossi[23] has investigated the elimination of indican in melancholia and in pellagra intoxication. He includes his melancholias under the depressive psychic states, and gives the urinary findings in nine cases, with amounts, color, reaction, specific gravity, chlorides, urea and indican. In four of these the indican reaction is designated as *present*, in two as *in excess*, and in one each as *marked*, *evident* and *manifest*. In nine cases of pellagra intoxication including melancholia, dementia and mania, the indican reaction is five times designated as in *excess*, twice *well marked* and twice *in traces*. It is to be regretted that more data were not given, considering the very excellent quality of the work. Richardson,[24] employing a new method not yet published, has done exact quantitative estimations of indol in various mental and nervous disorders. The work summarized is as follows, as given by the author, with the groups of cases:

Psychosis.	No. of cases.	Average indol in 24 hours.
Melancholia simplex,	8	0.2052 gramme
Non-febrile mania,	9	0.1089 "
Acute febrile mania,	8	0.07991 "
Non-febrile mania,	4	0.07456 "
Febrile mania,	5	0.06875 "
Puerperal mania,	6	0.51089 "
Melancholia simplex,	6	0.1969 "
Melancholia agitata,	5	0.1035 "
Melancholia attonita,	2	0.1625 "
Chronic melancholia,	4	0.3408 "
Epilepsy,	6	0.05924 "
Paranoia,	3	0.14002 "

The above summary shows that the amount of indol eliminated in the cases of melancholia of whatever form is in excess of the cases of mania, with the sole exception of the group designated as the puerperal type.

Tuczek[25] gives two cases of paranoia, in one of which there was 23 days and the other 28 days total abstinence from food. Summarized, his results are as follows:

Case 1. Paranoia with ideas of persecution and grandeur and hallucinations of hearing. Twenty-three days period of total abstinence, followed by spontaneous ingestion of food and return to the former state. Acetone appeared on the 16th day of starvation and continued constant until the third day of the ingestion of food, when it disappeared. Indican was constantly absent during starvation but appeared in strong reaction on the fifth day of the taking of food. During starvation the patient took only from 175-350 cc. of water daily—with the exception of 10 days, when not even water was taken. There were only two stools, one on the third and one on the 20th day of abstinence. During the ingestion of food, 121.9 to 171.9 grammes proteid daily and from 1692 to 3020 cc. water were taken. In this case acetone appeared coincident with the lack of proteid (inanition acetonuria) and disappeared coincident with its ingestion. The indican reaction was absent during the fasting, but appeared after the ingestion of food (due to intestinal decomposition and formation of indol).

Case 2. Paranoia. Ideas of persecution and grandeur. Abstinence for 28 days. During starvation, there were ingested from 2.3 to 30 grammes of proteid and from 300 to 2052 cc. water daily. Indican appeared on the 9th day and continued constant until the 2nd day of the ingestion of food, when it disappeared. Acetone appeared also on the 9th day, was constant till the 13th and then completely disappeared. During starvation the weight decreased from 119 to 106 lbs. on the 6th day, and as more proteid was ingested it rose to 110 lbs. on the 23rd day, then gradually decreased to 105 lbs. on the 24th day of the ingestion of food. During starvation there were four stools (on the 6th, 15th, 20th and 23rd days); during ingestion of food also only four stools up to the 25th day.

The latest contribution to the question is by Pilcz[26], who examined for indican, acetone, diacetic acid and albumose in the

periodic insanities, and gives the following urinary findings. In the circular insanities, in the manic and depressive phases, seven cases are given.

In Case 1, indican only during the depression.

In Case 2, excess of indican during melancholia which disappears with the clearing up, and in increasing quantities during the passage of mania into depression.

In Case 5, indican during depression only, none in the interval.

In Case 7, large amount of indican during mania, none throughout depression.

In Case 9, indican continually present during mania.

In Case 11, excess of indican during depression and albumose and indican during mania. In Cases 4 and 12, no indican was found.

In 6 cases of periodic mania there were the following findings:

In Case 15, traces of indican during mania and lucid interval.

In Cases 17, 19 and 20, indican found only during mania.

In Case 27, there was excessive indican 1 to 2 days before exaltation, disappearing 1 to 2 days before the quieting down.

No indican in Case 16.

He further states (Chapter XI) that the urinary findings show a peculiar persistence. The excessive secretion of indican may be combated by energetic intestinal antisepsis (calomel and creosote, and milk instead of meat diet). In Cases 27 and 11 these procedures were used for months without succeeding in appreciably reducing the indican excretion, while in the first case (27) constantly about 2 days before the clearing up and also in Case 11, before the lucid interval hyperindicanuria ceased spontaneously.

Analyzing the data of indicanuria in various mental and nervous disorders, several things are found to be fairly constant. Indican was found in excess in various depressive conditions by Rossi, Richardson and Berkley and in the greater number of the cases of Pilcz. This parallelism is further elaborated by Pilcz, who has shown in several cases the disappearance of the excess of indican coincident with the passage into exaltation, and inversely its gradually increasing quantities as mania again goes into depression. Some of his cases of mania are also associated with indicanuria. The findings of other observers (Starr, Wagner von Jaurreg, Régis) can be referred to intestinal putrefaction.

Wolowski in common with Pilcz, for various nervous disorders, has pointed out the disappearance of indican from the urine, coincident with the improvement of the disease. Tuczek's cases are simply metabolic disturbances due to starvation, independent of any psychosis. Indican, however, is a constituent of normal urine, and its mere presence, therefore, is only of relative value. More important is the amount eliminated, to show what relation exists, if any, with various psychoses, and coincident with an increased, a diminished or a normal amount, to show the bearing of this elimination upon various physiological factors, such as diet, stools and weight. If constant results are found under like physiological conditions, then and only then can we draw any conclusions as to the parallelism between indican-elimination, and the different states of psychic disorders. It was with these conditions in mind, that the following experiments were undertaken, to some of which I have added parallel tests for acetone and diacetic acid, with the same checks upon the metabolic conditions.

Although the presence of indican has been demonstrated in other organs, yet the findings in the urine are alone of clinical importance. Many methods have been devised both for the qualitative testing and quantitative estimation, and the very multiplicity of these methods shows that a sense of inaccuracy has been felt. The basis of all these methods is either volumetric or colorimetric, and a short resume of the more recent tests follows. Amann's method[m] depends upon the decomposition of the ethereal sulphates by a solution of persulphate of sodium or potassium in the presence of free sulphuric acid and the subsequent shaking out of the coloring matter with chloroform. It is essentially a modification of Stokvis's method, but I must say that my success with it has not been encouraging. The amounts of reagents required are large, and there seems to be a difficulty in adding the correct amount of acid, unless one knows by other tests what amount of indican may be expected. In Obermayer's method[n] we use as an oxidizing reagent a 0.2 per cent solution of ferric chloride in conc. HCl. The urine is first precipitated with lead acetate, and to the filtrate there is added an equal amount of Obermayer's reagent and the coloring matter is shaken out with chloroform. The reaction is well marked and in comparative tests made with the method of Stokvis, the color was of equal intensity

in the same specimens of urine. All of these, as well as previous qualitative methods, depend upon the splitting up of the combined sulphuric acid by the addition of concentrated mineral acids (H_2SO_4 or HCl) and the subsequent oxidation of the indoxyl to indigo blue by means of either ferric chloride, calcium chloride, calcium or sodium hypochlorite, potassium permanganate, bromine water, etc. More important, however, is not the mere presence of indican, but the amount eliminated, as shown by quantitative or colorimetric estimations. In the Wang-Obermayer method[29] use is made of the property of lead acetate to precipitate all the urinary coloring matters, except those in combination as sulphates, then oxidation with Obermayer's reagent, shaking out with chloroform and finally titration with a volumetric solution of potassium permanganate. The amount of the latter used is multiplied by its oxalic acid value and the product gives the amount of indican in the quantity of urine used.

The principle of Wolowski's method[30] depends upon the decolorizing property of calcium hypochlorite upon chloroform solutions of indigo blue until the coloring matter completely disappears. Two standard solutions of calcium hypochlorite are used, one containing 1 per cent and the other 0.1 per cent of active chlorine. The amount of chlorine used to decolorize is multiplied by 0.025, and the total daily excretion of indican is thus calculated. According to the author, there should be present 0.001 gramme of indican for each gramme of total solids.

The method used in these investigations is my modification of Stokvis's test, and has the advantage of combining rapidity with simplicity. It makes no pretensions to exact quantitative accuracy, but is merely a convenient manner of ascertaining whether indican be increased or diminished, and if so, to what extent. For my purpose it was sufficiently exact, as it furnished a fair index of whether hypo- or hyperindicanuria existed. As in all colorimetric estimations, such as the haemoglobin methods of Gowers or Fleischl, or even the later more accurate method of Jolles, the personal equation is the great factor by which errors creep in, even in observations made under the most favorable circumstances.

Method. Marked tubes are used, with a mark at 1 cc. for chloroform, at 10 cc. above for the urine and at 10 cc. above this for the HCl. Chloroform is introduced to the first mark, urine to

the second and HCl to the third. The whole is slightly agitated in order to more thoroughly mix the acid and urine, and then there is added a saturated solution of calcium hypochlorite drop by drop, until the mixture of urine and acid reaches its maximum blue coloration. This varies from 1 to 5 drops, usually never more than the latter amount. The thumb is placed over the orifice of the tube and the whole is rapidly shaken for at least 15 seconds. It is then tightly corked and set aside for 5 minutes, this being about the time in which the chloroform will have completely settled and the greatest intensity of color developed. The reading is then taken by reflected light according to the following color scale, the amount of indican being indicated by number. As the result of a large number of experiments, the normal indican color, when the above exact amounts of reagents were used, was found to be about that of ordinary litmus paper. The appended scale may therefore be taken as sufficiently accurate for clinical purposes, as accurate as any colorimetric method can be, and representing all possible gradations of color.

SCALE.

Indican number.	Indican color.	Amount of indican.
1	White.	Absent.
2	Very pale blue	Greatly diminished.
3	Pale blue.	Diminished.
4	Litmus blue.	Normal.
5	Slightly dark litmus.	Little above normal.
6	Dark litmus	Increase.
7	Indigo blue.	Large increase.
8	Very dark indigo blue.	Enormous increase.

With sufficient practice, these gradations of color can be exactly determined by reflected light. For my estimations, I prepared a scale of thick grey filter paper, dipped in solutions of indigo blue of varying intensity according to the above, and was successful in establishing a color that exactly resembled that of the chloroform extract. The above numbers will be used in indicating the amount of indican present, or rather the intensity of the indican reaction. As will be readily seen, 1 to 3 inclusive show hypoindicanuria. 4 is normal and 5 to 8 inclusive represent hyperindicanuria. If indigo red (or skatol) appear instead of indigo blue its amount is to be judged by the same intensity of color, for the source of both chromogens is from albuminous putrefaction, skatol being methyl-indol. In connection with this latter, Mail-

lard[31] has recently proven the indoxylic origin of certain red coloring matters of the urine, and Rössler[32] has shown the red pigment, appearing in the indican tests on the addition of the acid, to be skatol.

Until lately, the origin of acetone and diacetic acid was believed to be from beta-oxybutyric acid. This last was thought to be dependent, not upon the extent of proteid metabolism, but upon an abnormal destruction of body proteid. More recent opinions, however, point to their derivation from the fatty acid series, particularly the higher fatty acids[33]. Diacetic acid is probably produced as an intermediate product in the oxidation of beta-oxybutyric acid in the organism and readily decomposes into acetone. These three bodies stand in close relationship to one another, and therefore would possess about the same clinical significance, if any one appeared in the urine. Diacetic and beta-oxybutyric acids have never been observed as physiological constituents of the urine, but according to von Jaksch, acetone is a normal urinary constituent, but occurs in very small amounts (0.01 gramme in 24 hours). Appreciable or marked amounts therefore, of either acetone or diacetic acid, may mean several things, or rather serve as an index of various metabolic disturbances. They may occur in fevers, hunger and starvation, diabetes, inanition, various malignant growths, digestive disturbances after chloroform narcosis, as an expression of auto-intoxication and in various psychoses. Only the latter is of interest to us here and the following data are obtainable.

Rivano[34] reports the results of his investigations of the presence of acetone in various psychoses in the following table:

Psychosis.	No. of cases.	Positive results.	Negative results.
Epileptic insanity,	28	8	20
General paralysis,	10	9	1
Mania,	12	3	9
Melancholia,	21	13	8
Paranoia,	10	3	7
Secondary dementia,	6	1	5
Totals.	87	37	50

Lailler[35] also has pursued the same course and finds that acetone occurs as follows:

General paralysis,	9	times out of	10	Epilepsy,	8	times out of	28
Melancholia,	13	" "	21	Mania,	3	" "	12
Paranoia,	3	" "	10	Dementia,	1	" "	6

Marro[36] shows the interesting relation of acetone to fear. He finds large amounts of acetone in the urine in a case of delirium acutum, associated with terrific hallucinations and terror, followed by death in a comatose state. In an agitated form of general paralysis he also finds a noticeable amount of acetone. In a neurasthenic woman with a depressive agitation and olfactory hallucinations, the urine was very rich in acetone, as also in a case of puerperal psychosis with fear and obsessions. There was also abundant acetone in a case of dementia following melancholia, that was agitated, clamorous and afraid of being condemned to death.

Richardson, in the paper above cited,[37] in one case of epilepsy finds acetone present twice in traces out of five analyses and diacetic acid constantly absent, and in another acetone and diacetic were persistently absent in four analyses. In a third case, however, out of five analyses, acetone was present twice and diacetic acid constantly absent. It was always absent during the spasms and only in the interval could it be detected.

Tuczek's[38] findings have already been given.

Pilcz[39] in addition to his work on indicanuria, has the following results relating to acetone and diacetic acid. In cases of circular insanity, the urinary findings reported are, in Case 1, acetone and diacetic acid in the first week of the depression, absent during the manic stage and lucid interval, reappearing in passing over into depression. In Case 2, it is constantly absent except on the passage into depression. In Case 12, acetone was found only during melancholia. In periodic manias, it was twice found (Cases 16 and 17) during exaltation, coincident with diacetic acid.

In the above investigations on acetone, positive and negative findings in various psychoses, such as are given by Rivano and Lailler, are of little value. So many factors enter into the production of acetonuria, that unless the exact clinical condition be known, we can draw no conclusions from either the presence or the absence of acetone. My own tables, of course, are open to the same criticism, but they are simply the convenient end results of many cases, in which I have shown the relation to various psychic and metabolic disturbances. The relation of the production of acetone to fear, as pointed out by Marro, is very interesting, but further investigation seems to be necessary as to its origin.

Richardson in his findings has not attempted to show any parallelism of acetone and diacetic acid to the epileptic spasms or stupor. The acetonuria in Tuczek's cases can readily be accounted for on the basis of inanition. Pilcz's investigations, however, are more valuable, as there is shown a direct relation between acetone and diacetic acid and the depressed phases of the circular insanities, while on the other hand it was twice found during the manic exaltation.

The tests which I have used for the detection of acetone and diacetic acid are Lieben's iodoform, Legal's nitro-prusside of sodium in alkaline solution, Le Nobel's ammonia modification of the same, and Gerhardt's ferric chloride reaction. On account of the many sources of error of the last, if a positive reaction were obtained for diacetic acid, this was always verified by slightly acidifying the urine with sulphuric acid, shaking with ether in a separating funnel and then again shaking the ethereal solution with weak ferric chloride. The reaction was not designated as positive unless the watery solution of iron was colored either violet or claret red. With the new tests of Sternberg[40] and the paramido- and diazo-acetophenon reactions of Lipliawsky[41] and V. Arnold[42] I have had no experience.

The specimens which form the basis of the following analyses were invariably those of the morning urine. At first, specimens were chosen at random from various psychic disorders, the results of which I give in the tables following, showing not only the presence or the absence of, but also the intensity of the indican, acetone and diacetic acid reactions. The amounts of indican are designated by numbers according to my color scale, those of acetone and diacetic acid by the intensity of the various tests. Keeping metabolic conditions in mind, I also give the abstracts of twenty-six cases, following the fluctuations of these bodies through various psychic and physiological processes, and showing the relation of indican, acetone and diacetic acid to the varying clinical conditions. The abstracts are of course very short, but my plan has been to give only what is absolutely essential to the understanding of the chemical tests. In addition, I give graphic curves of the amounts of indican eliminated in the more important cases, and also a table showing the direct relation of the bodies tested to diet, stools and weight. The regular hospital

diet designated varied from day to day, but consisted of meats, milk, bread, various sweetened desserts, fish, vegetables and condiments, such as cocoa, coffee and tea. The relation of fats, carbohydrates and proteids was very well proportioned.

Case 1. L. K. Male. Age 17.

Periodic insanity, depressed form, first attack with two lucid intervals.

Onset sudden, with refusal of food and more or less complete mutism lasting from a week to ten days, with recovery and return to work. About a week later, there was a second episode of mutism lasting for two weeks, but with complete recovery as before. About three weeks later, a third attack, characterized by stupor, a feeling of inhibition, hallucinations of hearing, desire for death, mutism, refusal of food and general emaciation. This condition lasted for nearly a year, and the patient gradually improved until he became perfectly normal. Milk diet during the period of stupor. Daily stools. From November to April there was considerable loss in weight, from April to June an increase of 23 lbs. (80 to 103 lbs.).

Date.	Indican.	Clinical Condition.
Nov. 25, 1900.	7	Stupor and mutism.
" 30, "	7	Unchanged.
Jan. 3, 1901.	7	"
Apr. 2, "	2	Improved some. Speaks a little.
" 16, "	7	Coming out of stupor. Speaks freely but slowly.
" 21, "	1	Much improved. Slight stupor.
" 22, "	3	Brighter.
" 23, "	3	"
" 24, "	4	"
" 26, "	4	Active and smiling.
" 27, "	4	" "
" 29, "	3	Very active. Speaks freely.
May 7, "	2	Very active, speaks freely.
" 31, "	4	Entirely recovered.
June 1, "	2	" "

It will be observed in the above, that during the stupor the indican remained steadily high, while, parallel with the improvement, it gradually decreased, remaining low during the period of improvement and to the recovery.

Case 2. C. T. Female. Age 24. Katatonia.

Puerperal delirium with febrile onset. Albuminuria, restless-

TABLE I.—INDICAN.

Psychosis.	Indican.								Total specimens	Total increased.	Total normal or diminished.	Per cent increased.	Per cent normal or diminished.
	8	7	6	5	4	3	2	1					
Katatonia (stupor)	13	22	13	18	12	7	12	4	101	66	35	65.3	34.7
Katatonia (excitement)	1	0	1	0	0	6	2	3	13	2	11	15.4	84.6
Epilepsy (stupor)	2	0	3	1	0	2	1	0	9	6	3	66.6	33.4
Involution melancholia (depressed)	1	4	4	7	9	13	9	11	58	16	42	27.6	72.4
Involution melancholia (agitated)	0	2	0	2	3	2	0	1	10	4	6	33.4	66.6
General paralysis (akinetic)	4	4	2	2	1	1	6	4	24	12	12	50.0	50.0
General paralysis (exhilarated)	0	0	0	3	2	1	5	3	14	3	11	23.0	77.0
Dementia praecox (akinetic)	6	3	3	1	3	0	2	2	20	13	7	65.0	35.0
Dementia praecox (excited)	0	0	0	1	1	1	3	2	8	1	7	12.5	87.5
Manic-depressive (manic phase)	2	1	0	2	5	7	7	17	41	5	36	12.2	87.8
Manic-depressive (depressed phase)	14	12	20	12	11	6	4	3	82	58	24	70.7	29.3
Alcoholic depression	11	7	7	3	4	5	0	8	45	28	17	62.2	37.8

TABLE 2.—ACETONE.

Psychosis.	Strong.	Mod.	Weak.	V. weak	Absent.	Total cases.	Total present	Total absent.
Involution melancholia	22	13	8	5	10	58	48	10
Katatonia	..	1	..	..	22	23	1	22
Epilepsy (stupor)	..	..	..	..	3	3	..	3
Manic-depressive (manic phase)	..	..	1	..	14	15	1	14
Manic-depressive (depressed phase)	..	1	4	..	28	33	5	28
Alcoholic depression	..	..	9	1	26	36	10	26
Dementia praecox (akinetic)	..	2	3	..	2	7	5	2
Alcoholic hall. (with fear)	..	..	3	.	8	11	3	8
General paralysis (akinetic)	..	1	4	1	1	7	6	1
Total	22	18	32	7	114	193	79	114

TABLE 3—DIACETIC ACID.

Psychosis.	Strong.	Mod.	Weak.	Absent.	Total cases.	Total present.	Total absent.
Involution melancholia	20	12	6	20	58	38	20
Katatonia	..	..	..	12	12	..	12
Epilepsy (stupor)	..	..	..	3	3	..	3
Manic-depressive (manic phase)	..	.	..	15	15	..	15
Manic-depressive (depressed phase)	..	..	..	32	32	..	32
Alcoholic depression	..	..	..	36	36	..	36
Dementia præcox (akinetic)	..	1	..	6	7	1	6
Alcoholic hallucinosis (with fear)	..	..	1	10	11	1	10
General paralysis (akinetic)	2	..	4	1	7	6	1
Total	22	13	11	135	181	46	135

ness, confusion and disorientation. The onset was a week after the birth of a full-term, healthy child. The above condition gradually changed to the katatonic symptom-complex, with mutism, catalepsy, refusal of food, great depression and stereotyped attitudes. She gradually improved and became perfectly clear and normal. Milk diet during the stupor. Daily stools. From November to January, the weight increased from 91 to 122 lbs.

Date.	Indican.	Clinical Condition.
Nov. 13, 1900.	7	Stupor.
" 19, "	8	"
" 22, "	8	"
Jan. 5, 1901.	4	More active, coming out of stupor.
" 28, "	2	Active. Normal.
" 30, "	3	" "

It is to be regretted that more examinations were not made in this case, but the few given show a large amount of indican during the period of stupor, while, as the patient gradually improved, the amount of indican became low, coincident with the improvement, and so remained until complete recovery.

Case 3. M. F. Female. Age 31.

Katatonia, showing a cycle consisting of exhilaration and excitement on admission and shortly afterwards, posing and muscular tension. This was followed by a condition of apathy and gradually increasing mutism, going on to complete stupor, with catalepsy, oedema of the face and drooling of saliva. She remained in this state for six months, and after several episodes of dramatic excitement, went into a condition characterized by great activity, distractibility, productiveness, silly trifling and numerous posings and mannerisms. Milk diet during the stupor, later regular hospital diet. Daily stools. During the stupor from November 4 to March 29, the weight decreased from 87½ to 78 lbs., and from March to June rose to 113½ lbs.

Date.	Indican.	Clinical Condition.
Nov. 4, 1900.	6	Stupor.
" 15, "	6	"
" 20, "	4	"
" 22, "	5	"
Jan. 5, 1901.	8	"
Feb. 3, "	1	"
March 29, "	3	Out of bed. Continual motion.
April 3, "	1	" " "
" 11, "	3	Excited.
May 3, "	3	"
" 30, "	1	"
June 25, "	1	"

During the condition of stupor, large amounts of skatol were also present on three different occasions, and as the condition changed to one of excitement, skatol was found four times, but in very slight amounts. Skatol being like indol a product of albuminous putrefaction and eliminated in the urine as skatoxyl sulphuric acid, the fact that skatol closely follows the indol curve is more than a coincidence. In the above, with one exception, large amounts of indican were present during the stupor, and as the condition changed to one of excitement, there was a corresponding decrease.

Case 4. S. H. Female (colored). Age 31. Katatonia.

Onset very gradual, beginning with neglect of household duties, insomnia, indifference and gradually increasing mutism and stupor. In the hospital, the same stuporous condition continued, no reaction to pin prick, catalepsy, retardation, passive indifference and a little later stereotyped movements, echolalia, echopraxia and vivid dreams of a mystic religious nature. After remaining in this state for about six weeks, she gradually became more active, showed less retardation; became sprightly, preaching, exhilarated, showed statuesque poses, silly behavior and marked hallucinations of sight and hearing. This condition has persisted up to the present, with occasional outbursts of great over-activity and excitement. Daily stools. From January to August, weight increased from 108 to 129 lbs. During stupor, milk diet, later, regular hospital diet.

Date.	Indican.	Clinical Condition.
Jan. 23, 1901.	5	Stupor.
" 31, "	7	"
Feb. 3, "	7	"
May 25, "	3	Exhilarated and excited.
Aug. 1, "	3	" "

This case is almost identical with the previous one,—a condition of katatonic stupor going on to katatonic excitement with corresponding decrease of indican.

Case 5. E. C. Female. Age 35.

Dementia praecox with katatoniform episodes. The specimens were taken during one of these episodes, characterized by semi-

apathy, mutism and varying outbreaks of laughter and crying. No loss in weight. Daily stools. Routine hospital diet.

Date.	Indican.	Clinical Condition.
Nov. 2, 1901.	6	Semi-apathy and mutism.
" 15, "	6	" "
" 19, "	8	" "
" 22, "	8	" "

Indican invariably increased.

Case 6. A. G. Female. Age 29.

Katatonia following child-birth, with violence, religious trend of thought, incoherent productions, restlessness, insomnia and fever. She gradually became quieter and went into complete mutism, with a listless dreamy manner, slow movements and some passive resistance. Later she became a little more active, although still mute and showed much depression and frequent crying. Milk diet. Loss of 2½ lbs. from June to August. Stools, from June 20 to July 6, four to six daily, then two daily up to July 16, afterwards one stool daily.

Date.	Indican.	Clinical Condition.
June 20, 1901.	6	Mute and inactive.
July 4, "	8	" "
" 6, "	8	" "
" 8, "	8	" "
" 10, "	6	" "
" 13, "	7	" "
" 14, "	7	" "
" 15, "	8	" "
" 16, "	8	" "
" 17, "	7	" "
" 18, "	6	" "
" 23, "	6	" "
" 24, "	6	" "
" 26, "	8	" "
" 28, "	1	Sitting up a little.
" 29, "	4	More active but mute.
" 31, "	3	" "
Aug. 2, "	5	" "

Acetone was found present on June 20, but was constantly absent afterwards. Coincident with the greatest inactivity, indican was constantly increased in spite of the frequent stools. As the patient became more active, there was a decrease in indican.

Case 7. E. C. Female. Age 33. Manic-depressive stupor. With the exception of several episodes of excitement with religious productions and a peculiar muscular tension, the patient had been depressed, quiet, unproductive and showing marked retardation. She then went into a period of mutism with refusal of food (was tube-fed), became markedly dejected in manner, and in about 1½ months after admission was put to bed, where she has since remained. There with the exception of the excited episodes mentioned above, she has shown a uniform condition, submutism, retardation and an inactivity almost approaching a stuporous state. Milk diet (tube-fed). Daily stools. From April to July a loss of 3 lbs. in weight, then a gain of 1 lb.

Date.	Indican.	Clinical Condition.
April 3, 1901.	4	Depressed.
" 19, "	6	"
July 24, "	6	Mute and motionless.
" 25, "	7	" "
" 26, "	7	" "
" 27, "	6	" "
" 29, "	8	Episode of excitement.
" 31, "	4	Episode continues.
Aug. 1, "	4	" "
" 2, "	6	" " but less intense.

Here indican was increased during the stupor, with a sudden drop following the excitement, and again a rise as the excitement abated.

Case 8. M. P. Male. Age 30. Katatonia.

Four weeks before admission, he became depressed because he had been told by his physician he had phthisis. He showed violence without reason to members of the family, had sudden outbursts of screaming, became over-religious, claimed to both hear and see the patriarchs, said he was David, Abraham, etc. On admission, he was disoriented and confused, with one outburst of violence. Gradually he went into a stupor, refused food, showed some stereotypy, but no catalepsy. He gradually improved, began to show more interest in things, became brighter and more responsive. Milk diet. Daily stools. Gain of 6 lbs. in weight from November to April.

Date.	Indican.	Clinical Condition.
Nov. 16, 1900.	6	Stupor.
" 20, "	2	"
Jan. 2, 1901.	3	"
Feb. 2, "	7	"
" 6, "	4	"
" 7, "	5	"
Mar. 17, "	1	"
" 19, "	2	"
" 22, "	5	"
" 26, "	3	"
" 30, "	2	"
Apr. 1, "	2	"
" 3, "	2	"
" 20, "	2	"

Although there is here a continued stuporous condition, the indican with a few exceptions has continually remained low.

Case 9. A. R. Female. Age 58. Melancholia (depression, second marked attack on the ground of invalidism).

Negative family history. Essentially normal intellectual and sexual development up to the menopause, then she became very nervous and suffered from "hot flushes." She was first admitted to the hospital when 39 years old, and then was depressed, apprehensive, and certain of inevitable death from uterine hemorrhage. At home she had been in bed eight months. A little over a month after admission, she became more active and sociable and three months after admission was discharged much improved, remaining perfectly well for 17 years. In September, 1899, she began to complain of fatigue and in May, 1901, gave up housework, remained in bed most of the time, became much depressed, said she would never get well, could not live, etc. She was constipated and her appetite and sleep were very poor. She was admitted to the hospital September 23, 1901. Here, her memory, mental grasp and orientation were perfect, but she was much retarded, very weak, depressed, apprehensive, irritable and continually reacting to somatic ideas, such as peculiar feelings in the abdomen, claiming that food did not reach her stomach, etc. There was continued biting of the finger-nails. She took nourishment only on persuasion, and then only liquid food (milk) and at times was caught attempting to throw it out the window. Physically, she was normal, the heart sounds were clear, but the pulse was of high tension though easily compressed and varying

from 60 to 75. Temperature normal. The weight on admission was 115 lbs., but at the end of two months, it had fallen to 89½ lbs., with little or no improvement in the mental condition. Stools daily and normal. Sleep varied from four to eight hours but only with hypnotics. The blood showed nothing unusual except a marked decrease in the small mononuclear lymphocytes (7.5 per cent). Unfortunately, while in this condition, the patient was taken home against advice before further tests could be instituted.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 1, 1901.	4	Strong reaction.	Strong reaction.
" 3, "	3	" "	" "
" 4, "	3	" "	" "
" 5, "	4	Very strong reaction.	" "
" 6, "	7	Weak reaction.	Negative.
" 8, "	3	Moderate reaction.	Moderate reaction.
" 9, "	5	Strong reaction.	Strong reaction.
" 11, "	5	" "	" "
" 12, "	4	" "	" "
" 13, "	5	" "	" "
" 14, "	7	" "	" "
" 15, "	5	" "	" "
" 16, "	6	" "	" "
" 17, "	4	" "	" "
" 18, "	6	" "	" "
" 19, "	5	" "	" "
" 21, "	3	" "	" "
" 22, "	4	Weak reaction.	Weak reaction.
" 23, "	3	" "	" "
" 24, "	6	" "	" "
" 28, "	3	" "	" "
" 29, "	2	Moderate reaction.	Moderate reaction.
" 30, "	3	" "	" "
" 31, "	2	" "	" "
Nov. 2, "	1	Strong reaction.	Strong reaction.
" 4, "	4	" "	" "
" 5, "	6	Moderate reaction.	Moderate reaction.
" 6, "	3	" "	" "
" 8, "	3	Weak reaction.	Weak reaction.
" 9, "	5	Very weak reaction.	0
" 11, "	3	Moderate reaction.	0
" 12, "	2	Weak reaction.	0
" 15, "	2	Very weak reaction.	0
" 16, "	2	0	0
" 19, "	5	Weak reaction.	0
" 20, "	3	Very weak reaction.	0
" 21, "	2	" " "	
" 22, "	1	" " "	Very weak reaction.
" 23, "	1	Strong reaction.	Strong reaction.
" 25, "	2	Moderate reaction.	Moderate reaction.
" 26, "	1	" "	" "
" 27, "	1	" "	" "
" 28, "	1	" "	" "
" 29, "	4	" "	" "
" 30, "	1	" "	" "

On October 4th, the urine smelled strongly of acetone and there was an acetone odor to the breath, but none was detected in the stomach contents after an Ewald test meal. The indican at first remained rather steadily high, then somewhat decreased with prominent fluctuations, sometimes being high, sometimes completely absent. The mental condition remained the same. Acetone with one exception was persistently present, but the amounts varied, although each variation persisted for some length of time. The strongest reactions seem coincident with the largest amount of indican. With nine exceptions, diacetic acid was persistently present and ran parallel with the acetone, the strongest reactions with ferric chloride being present with the largest amounts of acetone and vice versa. When diacetic acid was absent, the acetone was usually present in small amounts.[1]

Case 10. E. L. Male. Age 50. Depressive delirium with relative stupor and apathy.

Onset sudden with depression, ideas of having lost his money, praying and crying "O God I'm done!" and begging forgiveness for fancied wrongs. His limited productions were very incoherent and given in a rambling tone. On admission to the hospital, he was resistive, complained of his head being a "little dizzy" and showed peculiar impatient stampings with his feet. He spoke but very little, and then only on urging. He maintained a quiet, dull attitude, was depressed and uncommunicative, was tube-fed occasionally, to which he offered violent resistance. About a month later he began to eat, but became very apprehensive, bumping his head frequently and reiterating some senseless content which once became a verbigeration. Fifteen months after admission, he was tube-fed for four days, after which he began to eat, but not if he thought himself watched by attendants. He became absolutely mute, remained in bed with the eyes closed, kept the bed-clothes completely pulled over his face and was almost absolutely motionless nearly the entire time. It was during the latter almost akinetic condition that the experiments detailed below were instituted. Five analyses of

[1] Since writing the above it has been learned that the patient died February 1, 1902.

the urine preceding October 25, 1901, showed the presence of enormous amounts of indican. Having Pilcz's experiments in mind, an attempt was made to study the influence of restricted diet and intestinal antisepsis upon the elimination of indican. Preceding the experiments, he was on regular hospital diet. On October 24, he was placed on a diet consisting of minimum amounts of proteid, which served to arrest fermentative processes in the intestine. We give here a list of his articles of diet with their percentages of proteid as given by Hammarsten.

Food.	Proteid in % (per 1000 grammes).
Milk,	35
White bread,	80
White potatoes,	20
Apples,	4
Corn starch	0
Beans,	27

Puddings of gelatin with flavoring extracts.

The above are merely the simple articles, and various combinations were given at different meals. Gelatin was allowed, because it yields neither indol nor skatol, but principally the amido-acids. On four occasions he refused to eat. For intestinal antisepsis there was given 0.3 gramme salol three times a day. During the period of the experiments, there was a loss of 1 lb. in weight, and considerable constipation. The restricted diet and salol were combined until November 6, and then the routine hospital food was resumed. The urine was always a morning specimen and as he voluntarily held it, he was catheterized daily. There was a well marked phenol reaction during the administration of the salol.

The indican remained steadily high until the administration of salol with restricted diet. Then it began to gradually decrease and remained fairly low with some slight fluctuations, though never entirely absent. When the salol was discontinued and regular diet resumed, indican again became enormously increased and so remained until the end of the experiment, the findings thus resembling those of the first period of routine diet. Acetone was found present five times. Diacetic acid was constantly absent.

Date.	Indican.	Acetone.	Diacetic Acid.
		Routine Hospital Diet.	
Oct. 16, 1901.	8	Large trace.	0
" 21, "	8	0	0
" 22, "	8	Trace.	0
" 23, "	8	0	0
" 24, "	8	0	0
		Diet and salol begun.	
" 25, "	4	Trace.	0
" 26, "	8	0	0
" 27, "	6	0	0
" 28, "	5	0	0
" 29, "	5	0	0
" 30, "	5	0	0
" 31, "	4	0	0
Nov. 2, "	3	0	0
" 4, "	2	Trace.	0
" 5, "	3	"	0
" 6, "	5	0	0
		Diet and salol discontinued. Routine diet resumed.	
" 7, "	7	0	0
" 8, "	5	0	0
" 9, "	7	0	0
" 10, "	6	0	0
" 11, "	6	0	0
" 12, "	6	0	0
" 13, "	6	0	0
" 14, "	8	0	0
" 15, "	7	0	0
" 16, "	7	0	0

Case 11. J. H. Male. Age 30. Alcoholic depressive hallucinosis.

Up to onset of the psychosis, the development was normal, with the exception of somewhat excessive masturbation. After a prospecting tour in British Columbia, in which he was unsuccessful and lost most of his money, he returned home. He was, however, changed; became seclusive, wrote peculiar letters and smoked and drank to excess. He began to feel that he was "lost," then for the first time in his life attempted intercourse with a prostitute, thought he was guilty of "impurity," of a "mortal sin" and that he must die. In reaction to these depressive ideas, he attempted suicide by jumping into the Charles river. On admission to the hospital, the depression continued, he refused food and was tube-fed, which has continued up to the present almost without intermission. He was intensely suicidal and agitated, begging to be allowed to go to the woods and hang himself, to be choked to death and muttering "I did it! I did it! the crime! by God!" There was intense restlessness, cry-

ing and wailing with self-accusation, incriminating masturbation as the cause of his depression. He fiercely resisted the introduction of the tube. This general mental attitude has continued up to the present without improvement. The weight on admission was 157 lbs., but at the end of eight months it had decreased to 97 lbs., in spite of the enforced daily feeding of large quantities of milk and eggs. Stools regular and daily. The same experiments were tried here as in the previous case (10). The indican remained steadily high upon the diet of eggs and milk. Beginning on November 16, he was tube-fed three times a day, a liter of milk at a time, to which was added with each feeding 0.5 gramme salol. Daily stools and no loss in weight during the period of the experiments. Both milk and kephir have a specially strong preventive action on putrefaction, due chiefly to the lactose and lactic acid. The urine gave a strong phenol reaction during the administration of the salol.

Date.	Indican.	Acetone. (Egg and milk diet.)	Diacetic Acid.
Oct. 29, 1901.	7	0	0
" 30, "	7	0	0
" 31, "	8	0	0
Nov. 1, "	6	0	0
" 2, "	8	0	0
		Milk diet and salol begun.	
" 16, "	8	0	0
" 17, "	4	0	0
" 18, "	8	0	0
" 19, "	3	Trace	0
" 20, "	5	0	0
" 21, "	6	0	0
" 22, "	7	0	0
		Egg and milk.	
" 23, "	6	0	0
" 24, "	8	0	0
" 25, "	8	0	0
" 26, "	8	0	0

In the above, there was a slight decrease in the amount of indican eliminated during the period of milk diet and salol, but this parallel is not as marked as in the previous case.

Case 12. A. D. Female. Age 61. Periodic insanity, depressed form, third attack.

The first attack was at the menopause, lasting one year, the second in 1896, but of only a few weeks' duration. The pres-

ent attack began six months before admission with a feeling of uneasiness, a dull sensation in the head, the patient being very restless and easily excited. In the hospital, she was depressed, very apprehensive and continually complaining of exhaustion and a peculiar feeling in the abdomen. She was much afraid, but could give no adequate explanation of her fear. The pulse varied from 65 to 70, was strong, of a high tension and not easily compressed. She was placed on an absolutely liquid diet of at least 1 liter of milk and 2 to 3 liters of water daily. After a few weeks, the pulse became softer, though still slow, and the mental condition improved. The blood showed nothing unusual except a decrease in the small mononuclear lymphocytes. The urine was taken during the period of liquid diet. During this time she lost 2 lbs. in weight. Daily stools.

The daily amount of urine varied from 1500 to 2350 cc., with a low specific gravity (1007-1010), low total solids (31.45 to 46.97 grammes) and a low elimination of urea (9.9 to 20.16 grammes). The small amount of indican present (or rather the low indican index) was undoubtedly due to the extreme dilution of the urine by the liquid diet. Probably, the total amount of indican was higher than the color index showed.

Date.	Indican.
Sept. 13, 1901.	2
" 15, "	3
" 16, "	3
" 17, "	2
" 18, "	2
" 19, "	3
" 21, "	2

Case 13. C. McG. Female. Age 38. Alcoholic depression with polyneuritis.

History of onset not obtainable. On admission she was depressed and despondent, slept only with hypnotics, thought she was " marked " like an animal, and that people avoided her because of an offensive odor about her person. She spoke of herself as being the " wickedest woman in the world," and was remorseful for a previous immoral life. The mental condition remained stationary and five months after admission she was put to bed for polyneuritis. There she has since remained, much depressed, inactive, speaking only when spoken to, mostly of the

content "I will never be better." She complained of pain and a burning sensation in the limbs. She took food only by persuasion, saying that there were worms both in it and in herself, which consumed whatever food was ingested. Occasionally tube-fed. Within a year, her weight has decreased from 100 to 74½ lbs. Daily stools. Liquid diet of milk and eggs. During the period of the urine examinations, she gained 4 lbs.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 13, 1901.	1	Trace	0
" 15, "	4	0	0
" 16, "	3	Trace	0
" 17, "	3	0	0
" 18, "	3	Trace	0
" 19, "	3	0	0
" 21, "	8	0	0
" 22, "	5	0	0
" 23, "	7	0	0
" 24, "	7	0	0
" 27, "	7	0	0
" 28, "	8	0	0
" 29, "	6	0	0
" 30, "	4	0	0
" 31, "	6	0	0
Nov. 1, "	8	0	0
" 2, "	6	Trace	0
" 4, "	7	0	0
" 15, "	8	0	0
" 16, "	5	Trace	0

In the above with few exceptions. indican was eliminated in large quantities, and in spite of the gain in weight, acetone was present in traces eight times.

Case 14. E. McC. Female. Age 23. Katatonia. Onset of the psychosis after childbirth. The labor was normal. She remained in bed for about a week, appeared very tired and ate and slept poorly. She soon became indifferent, neglected her housework and her baby, and, on the advice of her physician, again went to bed. Became passive, indifferent and mute. On admission, she showed an expression of absolute placidity and rest, muscular resistance in the elbow; she answered questions in monosyllables and only after urging. She lay entirely motionless in bed, continually drooling a thick, stringy saliva. Catalepsy of the arms and legs was present. Later, there was an occasional faint smile, and once or twice an episode of apparently

causeless crying. Otherwise there has been no change. Weight stationary. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Sept. 24, 1901.	6		
" 25, "	5		
" 27, "	6	0	
Sept. 28, "	6		
Oct. 3, "	7	0	0
" 4, "	8	0	0
" 7, "	6	0	0
" 9, "	8	0	0
" 13, "	3	0	0
" 14, "	3	0	0

Indican constantly high, with two exceptions. No acetone or diacetic acid.

Case 15. W. P. Male. Age 63. Manic-depressive psychosis, third attack.

On admission, the patient was very talkative and active, showing a feeling of well-being and childish exaltation. He boasted, bragged, showed a superior air, was full of business details, yet without accomplishing anything. He emphasized many of his statements with a string of oaths. No distractibility. He was always in motion, very restless and seldom sat down. This condition continued for a little over a month. Then he became less active, spent most of his time in his room, sitting down and thinking, and never speaking unless addressed. He was much depressed and frequently cried. Weight has increased from 127 to 132 lbs. Daily stools. Routine hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
		Exhilaration.	
Nov. 5, 1901.	2	0	0
" 26, "	1	0	0
" 27, "	1	0	0
" 28, "	1	0	0
" 29, "	2	0	0
" 30, "	2	0	0
Dec. 1, "	1	0	0
		Depression.	
" 9, "	5	0	0
" 10, "	5	0	0
" 11, "	4	0	0
" 15, "	5	0	0

Indican very low or absent during exhilaration, increased during the depression. Acetone and diacetic acid constantly absent.

Case 16. M. H. Female. Age 40. Melancholia.

Characterized by much depression, confusion, perplexity and self-accusation. She maintains a dejected attitude; sits all day with her head bowed down and her hands folded in her lap, seemingly oblivious to her surroundings, yet quickly reacting to any unusual sound. She has a vague feeling of something going on that she cannot account for; everything is wrong and twisted; she herself is the cause of everything; it is impossible to do right even on effort. She is continually troubled with noises as of approaching footsteps, and with voices saying that she is a bad girl and lost forever. "I ought to be dead a hundred years ago. . . .Oh, the ship is going to sink! . . . I want to go this very day and put myself where no one will ever see me again. Let us come. I hear the music." Later she became restless and agitated, but still depressed, walking the wards or standing about in a perplexed manner. Loss of 6 lbs. in weight. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 3, 1901.	1	0	0
" 5, "	1	0	0
" 7, "	2	0	0
" 8, "	2	0	0
" 9, "	1	0	0
" 10, "	3	0	0
" 11, "	1	0	0

Indican constantly low or absent. Acetone and diacetic acid absent.

Case 17. R. T. Male. Age 58. Agitated melancholia.

Extreme restlessness and agitation, talking to himself with marked self-accusation, especially in regard to previous habits of masturbation and producing such phrases as "I am burning up the world, and a trouble to my people!" Weight constant. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 19, 1901.	7	0	0
" 21, "	4	0	0

Case 18. F. S. Male. Age 51. Manic-depressive psychosis, fifth attack.

The present is the manic phase, characterized by great spontaneity of production, hyperactivity, formal associations, the writing and reciting of large quantities of doggerel rhyme and drawing caricatures of various people. No thinking disorder or flight of ideas and only moderate distractibility.

Weight stationary. Bowels regular. Routine hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Nov. 26, 1901.	1	0	0
" 27, "	1	0	0
" 28, "	1	Trace	0
" 29, "	3	0	0
Dec. 1, "	2	0	0

Indican very low or absent. Acetone found once in traces.

Case 19. J. C. Male. Age 26. Delirium tremens of two days' duration.

There was confusion, complete disorientation and terrible fear with great emotional disturbance. He thought he was to be executed, his head chopped off, and his bones taken from his body and thrown into the lake. He reacted to voices telling him that his last day had arrived; he frequently begged to be allowed to smoke his last cigarette, and then to be given some chloral that he might not feel the pain of his tortures. Milk diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Nov. 27, 1901.	2	0	0
" 28, "	1	0	0

Case 20. G. U. Male. Age 40. Dementia praecox, paranoiac form with mutism.

The specimens were taken during a period of mutism and inactivity. He showed great muscular resistance and would sit all day in one position with his head bent forward. Unfortunately, before more examinations could be made, he was taken home against advice.

Daily stools. Gained 1 lb. in weight. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 15, 1901.	4	Well marked reaction.	0
" 16, "	4	0	0

Case 21. A. M. Male. Age 39. Periodic insanity, depressed form, first attack.

Onset was rather sudden. Psychosis characterized by retardation, self-accusation, depression and some restlessness. Later he showed lack of spontaneity and lack of interest in his surroundings, answered questions only on urging and would sit or stand in one position with head bowed down for hours. Gain in weight during period of urine examinations.

Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 30, 1901.	4	0	0
" 31, "	6	0	0
Nov. 1, "	5	0	0

Case 22. B. P. Male. Age 35. Dementia praecox.

Onset gradual, two years before admission. There was worry without apparent cause, later delusions of apprehension; he hid himself from visitors, refused to undress and slept poorly. Once he would not eat for three days, and for a week was mute and would only reply by writing in a little book. On admission he showed a normal reaction, but would not explain his peculiar behavior at home. Two months later he gradually went into a mute, stuporous condition, refused food and was tube-fed. This continued for three weeks and he returned to normal. Suddenly, three weeks later, he became akinetic, absolutely passive, mute and refused food. There was no passive or active resistance in the limbs and no catalepsy. He would stand in one position all day, hands held rigidly at his side, head thrown slightly back, and, if compelled to sit down, in a few minutes would resume his former statuesque attitude. During this last episode the weight has decreased from 147 to 138 lbs. Bowels constipated. Tube-fed twice daily with milk and eggs. Urine examinations were made during this episode. The specimens were difficult to obtain, as the patient was untidy.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 29, 1901.	3	0	0
Nov. 2, "	3	Good reaction.	Good reaction.
" 4, "	6	Trace	0
" 6, "	6	"	0
" 25, "	1	0	0

Indican variable, but twice very high. Acetone present three times and diacetic acid once.

Case 23. C. C. Male. Age 43. General paralysis.

The clinical condition, during which the urine examinations were made, was as follows:

Following a series of epileptiform convulsions, the patient became weak in his legs and was placed in bed, where he failed rapidly, both mentally and physically. He went into an absolute dementia, recognizing no one, grinding his teeth, with occasional twitchings of the hands and face and blind fumbling at the bed-clothes. While in bed he had a series of convulsions, swallowed with difficulty, and took only a few spoonfuls of liquid peptonoids every 24 hours. As he grew rapidly weaker, he was tube-fed twice daily with milk, eggs and brandy. He has lost weight, lies absolutely motionless in bed, and there is marked stiffness of the limbs and resistance to passive motion. One to two stools daily. During the period of convulsions, there was a temperature of 100° to 101.4°, with a leucocytosis of 21,136 the increase being mainly in the polymorphonuclear forms.

Date.	Indican.	Acetone.	Diacetic Acid.
		Very little liquid food.	
Oct. 27, 1901.		Strong reaction.	Strong reaction.
" 28, "		Good reaction.	Good reaction.
		Tube-feeding begun twice daily, with eggs and milk.	
" 30, "	7	Trace	Trace
" 31, "	8	"	"
Nov. 1, "	8	Very weak reaction.	Very weak reaction.
" 2, "	8	"	"
" 6, "	8	0	0

During the period of almost total abstinence from food, indican was completely absent from the urine, but immediately after tube-feeding was begun, there were large amounts eliminated. The reactions for acetone and diacetic acid were strongest during the period of the least ingestion of food, but following tube-feeding, the amounts steadily decreased, and finally were completely absent.

Case 24. J. G. Male. Age 62. Periodic insanity, depressed form, third attack.

There were two previous attacks of depression, one in 1859, the other in 1875, both of which lasted four months and went on

to complete recovery. Onset of the present attack was gradual. After the failure of a newspaper, of which he was an editor, there followed *grippe*, restlessness, insomnia, dull headache, weakness with gradually increasing despondency and depression. There was marked initial retardation; he was apprehensive and self-accusatory, and there was a haunting fear of dying every night. Voices told him of his impending death and his doom to eternal punishment for past sins. He slept only by hypnotics. A loss of 4½ lbs. in weight. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Nov. 26, 1901.	6	0	0
" 27, "	1	0	0
" 28, "	2	0	0
" 29, "	5	0	0

Case 25. C. G. Male. Age 70. Alcoholic depression, with hallucinations, great emotion of fear, agitation and an attempt at suicide.

The patient has used alcoholics all his life, and shortly before admission, while in jail for intoxication, he attempted suicide by hanging. He had marked hallucinations of hearing and complete place disorientation. Most marked was an emotion of fear,—he thought he was to be placed in a "great black hole," to be maimed, to be put on a hot fire forever, thrown into boiling water and tar; his flesh was to be burnt off his body, and he was to live forever in the most frightful torture. He believed every night was to be his last. "Oh, my doom is there! over there! Let me meet it! I want to go over into that hole! I am going to live forever and ever in agony!" This depressive, fearful conception was constantly reiterated with much agitation and restlessness. Sleep was fair. Loss of 1 lb. in weight. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 7, 1901.	6	0	0
" 16, "	4	Trace	Trace
" 17, "	1	0	0
" 19, "	1	Trace	0
" 23, "	1	0	0
" 24, "	1	0	0
" 25, "	1	0	0
" 26, "	1	Trace	0
" 29, "	1	0	0

With two exceptions, indican was constantly absent. Acetone was present three times in traces, diacetic acid once.

Case 26. J. M. Male. Age 19. Katatonia.

Onset sudden, with hallucinations of sight and rambling religious talk. In the hospital at first he showed psychomotor restlessness, singing, playing, grimacing, and later, silly laughter, spitting, echopraxia, echolalia and catalepsy. On account of vomiting he was placed in bed, where the above symptoms gradually disappeared. He went into an unproductive condition, showed some muscular negativism, became dreamy and semi-stuporous, but with occasional outbursts of excitement. The specimens were taken during the quiet phase. Weight decreased 3 lbs. Daily stools. Regular hospital diet.

Date.	Indican.	Acetone.	Diacetic Acid.
Oct. 15, 1901.	4	0	0
" 16, "	5	0	0
" 17, "	5	0	0
" 18, "	3	0	0
" 21, "	3	0	0

Analysis of the Chemical Findings.

In glancing over the material here presented, and attempting a critical analysis of the same, we seem at first to be confronted by something manifold and heterogeneous in its character. However, taking the findings step by step in their logical order and discussing the varying conditions and manifestations, there will be seen almost constant results. Turning our attention first to indican, since to the study of this substance is devoted the greater portion of the work, we find that we have to deal principally with its increase or diminution. Glancing at Table 1, increased indican is found to be a manifestation of katatonic and epileptic stupor, akinetic forms of dementia praecox and general paralysis, being met with also in alcoholic depression and in the depressed phases of the manic-depressive psychosis. This large elimination of indican is also found during the stupurous period of cases 1, 2, 3, 4, 5 and 10, during the inactive period of cases 6, 7, 11, 13, 14, 21, 22 and 23, and also as case 15 went into depression. In cases 8, 9, 12, 16, 24, 25, 26, on the contrary, there are many distinct fluctuations from high to

RELATION OF INDICAN AND ACETONE TO STOOLS, DIET AND WEIGHT.

Case.	Stools.	Diet.	Weight.	Indican.	Acetone.
1	Daily.	Milk during stupor, later regular hospital diet.	During stupor loss, later gain from 80 to 103 lbs.	High during stupor, later gradual decrease.	Not tested.
2	Daily.	Milk during stupor, later regular hospital diet.	Increased from 91 to 122 lbs.	High during stupor, later decreased.	Not tested.
3	Daily.	Milk during stupor, later regular hospital diet.	Decreased during stupor. Increased in excitement.	High during stupor, decreased during excitement.	Not tested.
4	Daily.	Milk during stupor, later regular hospital diet.	Increased from 108 to 129 lbs.	High during stupor, low during excitement.	Not tested.
5	Daily.	Routine hospital diet.	Constant.	High.	Not tested.
6	Diarrhea for 16 days, 2 daily stools for 10 days, then daily.	Milk.	Loss of 2½ lbs.	Steadily high.	Present once.
7	Daily.	Milk.	Loss of 3 lbs. for 4 months, then gain of 1 lb.	Steadily high.	Not tested.
8	Daily.	Milk.	Gain of 6 lbs.	Variable, but mostly high.	Not tested.
9	Daily.	Milk.	Loss of 25½ lbs.	At first high, then a decrease, with high fluctuations.	Constantly present, from traces to large amounts.
10	Constipated.	At first routine, later restricted diet with salol.	Loss of 1 lb.	At first high, decreased under restricted diet, again high on regular diet.	Present four times in traces.
11	Daily.	At first milk and eggs, then milk alone with salol.	Constant.	High under milk and eggs, then decreased under milk and salol, high again on resuming milk and eggs.	Present once in traces.

Case.	Stools.	Diet.	Weight.	Indican.	Acetone.
12	Daily.	Milk.	Loss of 2 lbs.	Low.	
13	Daily.	Milk and eggs.	Gained 4 lbs.	For a few days low, then constantly higher.	Present 8 times in traces.
14	Daily.	Regular hospital diet.	Constant.	Steadily high.	Constantly absent.
15	Daily.	Regular hospital diet.	Gained from 127 to 132 lbs.	Low during exhilaration, high during depression.	Constantly absent.
16	Daily.	Regular hospital diet.	Loss of 6 lbs.	Low.	Constantly absent.
17	Daily.	Regular hospital diet.	Constant.	High.	Constantly absent.
18	Daily.	Regular hospital diet.	Constant.	Low.	Present once in traces.
19	Daily.	Milk diet.	Constant.	Low.	Constantly absent.
20	Daily.	Regular hospital diet.	Gain of 1 lb.	Low.	Present twice.
21	Daily.	Regular hospital diet.	Gain in weight of (?) lbs.	High.	Constantly absent.
22	Constipated.	Milk and eggs.	Decrease from 147 to 138 lbs.	Variable, but high twice.	Present 3 times.
23	One to two daily	At first a little peptonoids, later liberal milk and eggs.	Could not be moved, but has lost weight.	Low during peptonoids, high during milk and eggs.	Present 6 times.
24	Daily.	Regular hospital diet.	Loss of 4½ lbs.	Variable.	Constantly absent.
25	Daily.	Regular hospital diet.	Loss of 1 lb.	Low.	In traces 3 times.
26	Daily.	Regular hospital diet.	Loss of 3 lbs.	High.	Constantly absent.

low, often abrupt and inexplicable, although these latter can be grouped clinically in almost the same class as the first. In Table 1, I have used the term akinetic as including in a wider sense those conditions characterized by either stupor, retardation or inactivity, with either mutism or poverty of production. In this class are included katatonic or epileptic stupor, alcoholic depression, demented and bed-ridden cases of general paralysis, the depressive phases of manic-depressive psychoses, inactive cases of dementia praecox and involution melancholia without agitation. With the exception of the last class, all my group of so-called akinetic cases, as given in Table 1, shows a high percentage of increased indican, and the same holds true for the separate cases above cited. This is the more striking when we consider that this excessive elimination is independent of any form of psychosis, but occurs in those conditions whose most important symptom is akinesis.

It remains now to discuss the origin, relations and general characteristics of this hyperindicanuria. The theory that this akinetic condition is due to intestinal auto-intoxication, of which the excessive indican elimination is merely an index, seems at first glance fascinating and satisfying. But in all my work I can safely say that I have not even the slightest proof or hint of this, nor am I led to look upon indican as an index or to refer the clinical state to the production of toxic products of proteid metabolism. Yet, in connection with this, Herter's experiments on chronic indol poisoning are most interesting, in which he produced in man and rabbits, greatly diminished activity and general lassitude, or, in the words of my own nomenclature, a condition of partial akinesis. Unfortunately, however, his results were not constant, and even in the monkey, the mammal most nearly related to man, no effects were seen after the administration of indol for two months. The results of the Italian investigators are also at variance—one (Christiani) observing increased reflex irritability and slight transient paralysis; the other (Rovighi), producing torpor and somnolence. Clinically, increased indican has been observed in various depressions and in psychoses associated with gastro-intestinal fermentation, but this can be referred to various somatic conditions. In Pilcz's cases alone is there any direct parallelism between indican and various states

of depression and exaltation. For the lack of any direct proof we can thus easily dispose of the theory of auto-intoxication for the present as a factor in producing akinetic states, manifested physiologically by hyperindicanuria.

From Müller's observations on Cetti we learn that during starvation, in which there is great loss of weight, there is a rapid decrease of indican. In my own cases, large amounts of indican were found in those in which there was decrease of weight (1, 3, 6, 7, 9, 10, 23, 26), and also in those in which the weight was constant or there was a gain (2, 4, 5, 8, 11, 13, 17, 21).

One of the most important metabolic conditions is diet, as those food stuffs which retard or inhibit intestinal fermentation can cause a diminished production of indol—which means that the urinary indican will be decreased or totally absent—while those foods which favor fermentation can cause large amounts of indican to be eliminated. In a large hospital, however, where, for economic reasons, the patients are kept upon a routine diet, errors, if any such enter in, are always constant, and hence merit but little consideration. The greater part of my cases were upon this routine diet, and yet, parallel with the clinical condition of each indivilual case, we find greatly varying amounts of indican. Indeed, in those cases in which there were enormous quantities of indican eliminated, the diet was exclusively milk, which has an especially strong preventive action on intestinal putrefaction. In Cases 1, 2, 3 and 4, the greatest indican production was during the period of milk diet, and this greatly diminished when regular hospital food was resumed, this latter of course being coincident with the coming out of the stupor. In Cases 11, 13, 22 and 23, milk and eggs were given daily, and in the latter, during the period when little food was ingested, but little indican was eliminated; but the amount quickly rose when tube-feeding was regularly begun with milk and eggs. On the contrary, in Cases 10 and 11, under the administration of restricted diet and intestinal antisepsis (milk, low proteids, salol), there was but little decrease in the amount of indican eliminated.

It is well known that during depressive conditions there is a general sluggishness of the organs as shown by diminished secretions and the slowness of the circulatory apparatus. This excessive indican elimination, therefore, during akinetic states

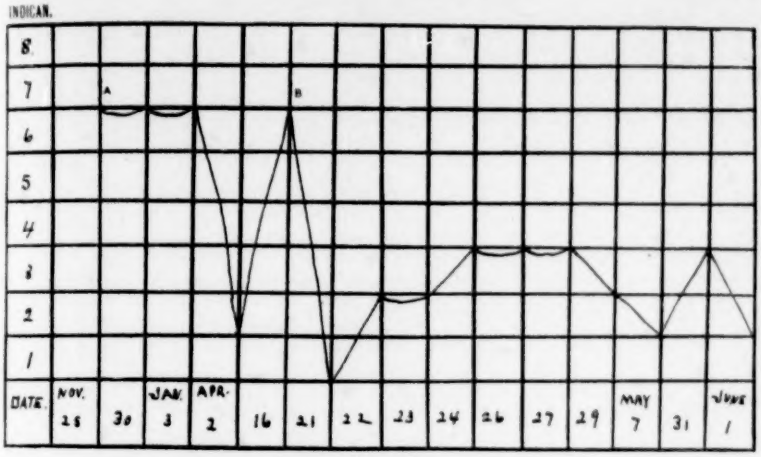
may be due to intestinal torpor, and by reason of this, there are formed favorable conditions for stagnation and therefore proteid decomposition, which means excessive indol production, of which the hyperindicanuria is the consequence. Constipation apparently plays no part, although this would be a symptom of the general sluggishness, because in all of my cases, with one exception (Case 10), there were daily stools, and, in fact, in Cases 6 and 23, there was some diarrhea. The elimination of indican seems to be somewhat greater in the stupor than in the merely inactive conditions as shown by my curves, but the difference as pointed out by these and by Table 1 is rather slight. Having thus practically ruled out the various metabolic disturbances and the influence of diet that may give rise to a hyperindicanuria in various physical conditions, we are still confronted by the striking parallelism that exists between excessive indican elimination and various akinetic disorders entirely independent of the form of mental disease. Until further investigation has been made, we can look upon this as merely a portion of the symptom-complex. Its significance cannot be exactly determined at present.

Again reverting to Table 1, we find that diminished indican excretion is parallel with katatonic excitement, the involution melancholias, the exhilarated forms of general paralysis, being also noted, in excited cases of dementia praecox and in the manic phases of the manic-depressive psychoses. In over one-third of the manic cases it was absent. This class of cases can be grouped together under hyperkinetic states, by which is meant those conditions characterized by excitement, agitation, exhilaration or hyperactivity. This diminished indican excretion is found in Cases 1 and 2, as they progressed to recovery from the previous stupor, and as Cases 3 and 4 went into a condition of katatonic excitement. It is also found during the exaltation of Cases 15 and 18. The group of melancholias, whether depressed or agitated, shows the higher percentage to be on the side of diminished indican, which is further exemplified in Case 16 and during the low fluctuations of Case 9. The metabolic conditions for the akinetic states hold true here. All of the cases had regular hospital diet, the stools were daily and the weight was either increased or constant, the latter probably being due to improved

appetite. Neither can we look upon it as a hyperactivity of the intestinal tract, which would mean unfavorable conditions for the stagnation of the digestive products, and therefore act as an inhibitory factor in proteid decomposition. This, for the reason that scarcely in either stupor or excitement, was there any evidence of intestinal disturbances. Most remarkable is the sudden increase of indican after the very low elimination as Case 15 passed from the exaltation into the depression.

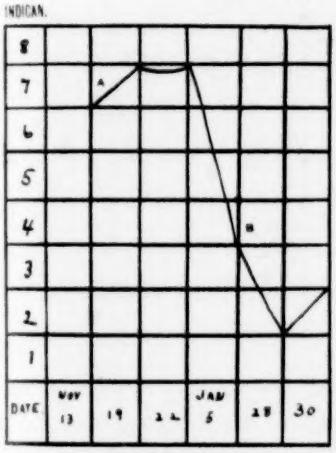
Reviewing the parallelism between excessive and diminished indican excretion and conditions of akinesis and hyperkinesis, and the various fluctuations in the transitions from one form into another, under almost exactly the same metabolic conditions, I can merely reiterate what was said above. The variations in indican elimination run constantly parallel with the conditions cited, and entirely independent of stools, diet and weight, the three factors that would seem to exert the most influence. The entire parallelism seems to be but a concomitant symptom of the akinetic or hyperkinetic state,—its origin is obscure and the significance cannot even be determined or hinted at without further research. The problem at present must remain unsolved until we learn more of the physiological and pathological chemistry of the various psychoses.

Considering the close relationship that exists between acetone and diacetic acid, what refers to one will apply equally to the other. Glancing at Table 2, acetone was found in all the groups except epileptic stupor—and diacetic acid was present in melancholia, the akinetic conditions of dementia praecox and general paralysis, and in alcoholic hallucinosis associated with fear. There seems to be no direct parallelism between the various psychoses and the production of these two bodies. As the two tables are simply the end results of various cases, and are only of a relative value, it is best to consider these cases in detail. In Case 9, acetone was constantly present in varying amounts, and diacetic acid was absent but nine times. In this patient there was a loss of 25 lbs. in weight. Acetone was also found four times in Case 10, but here also there was a loss of 1 lb. in weight. In Case 11 it was found once in traces with a constant weight. In Case 13, acetone was present in traces eight times, during which time the patient gained 4 lbs. In Case 18 it was present once in



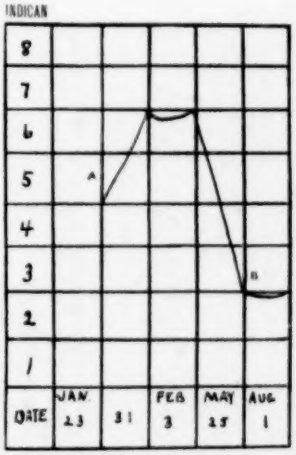
CASE I.

A, Stupor. B, Coming out of stupor.



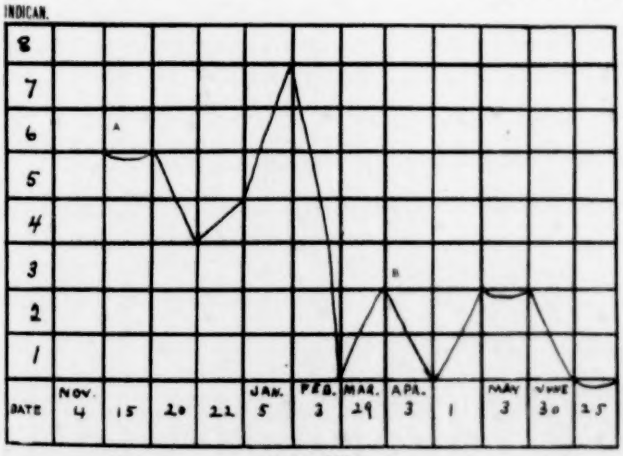
CASE II.

A, Stupor. B, Coming out of stupor.



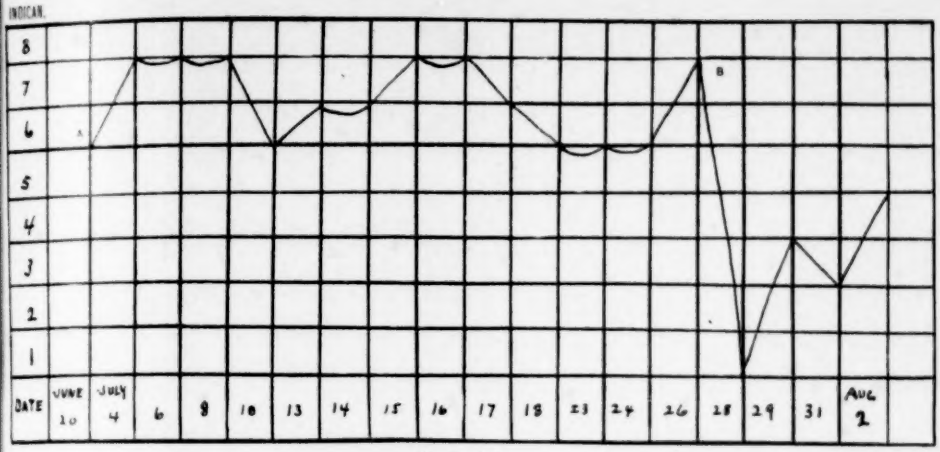
CASE IV.

A, Stupor. B, Excitement.



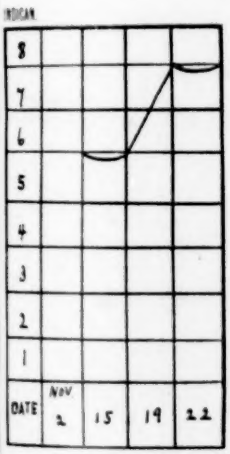
CASE III.

A, Stupor. B, Beginning excitement.



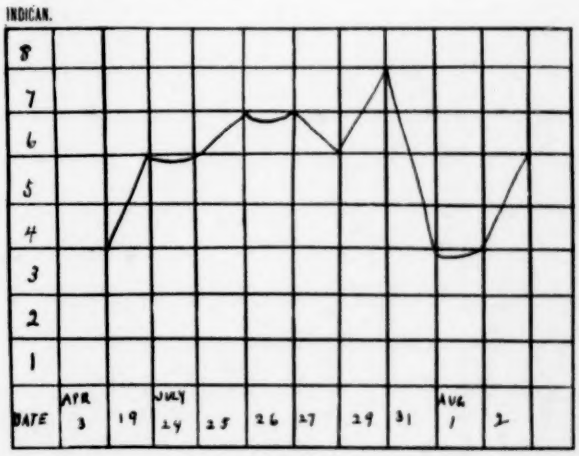
CASE VI.

A, Mute and akinetic. B, More active.



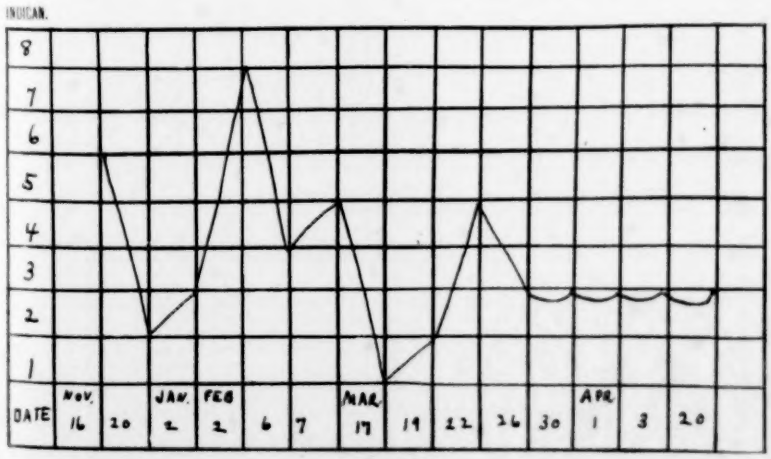
CASE V.

Constant stupor.

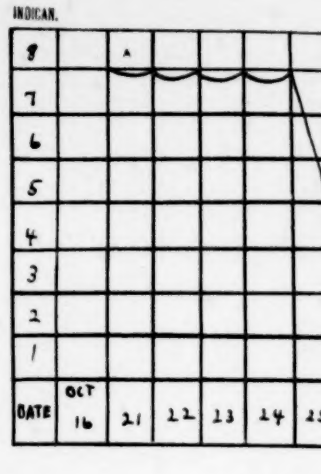


CASE VII.

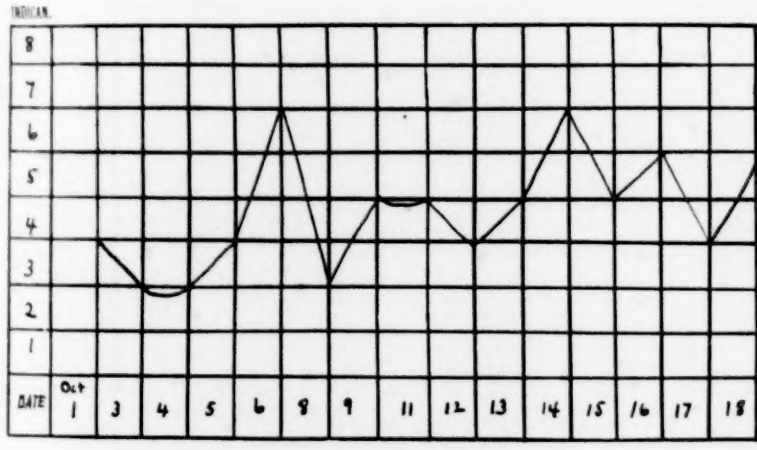
Mute and akinetic.

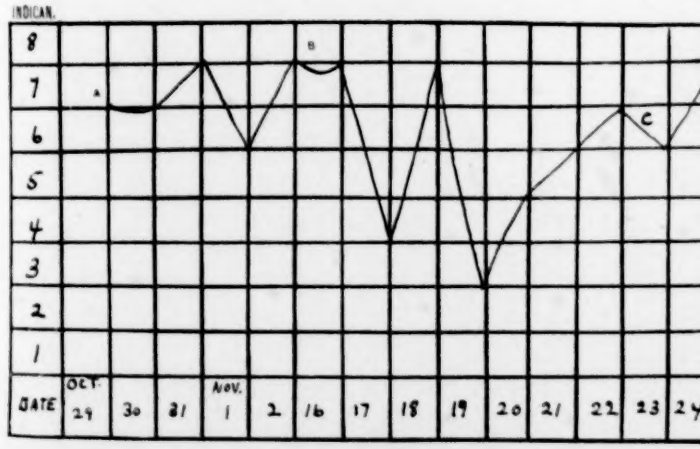


CASE VIII.



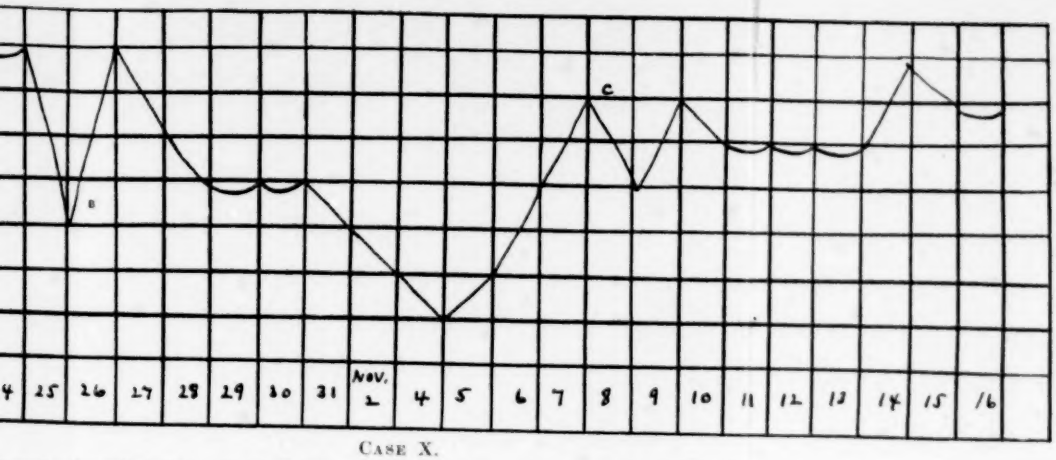
A, Regul





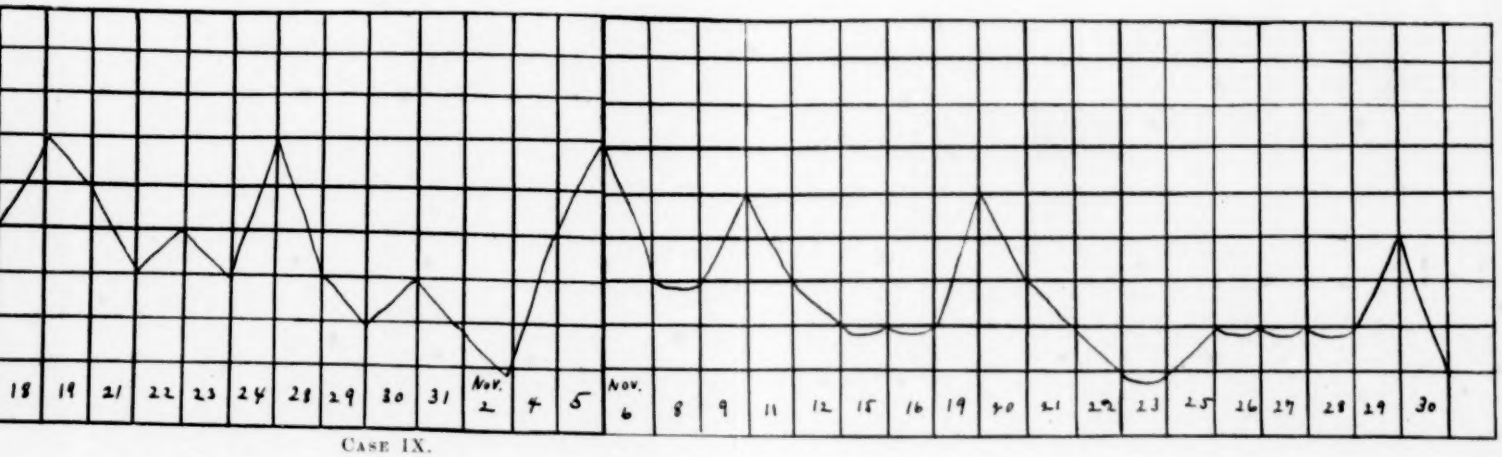
CASE XI.

A, Milk and egg diet. B, Milk diet with salol. C, Milk and egg

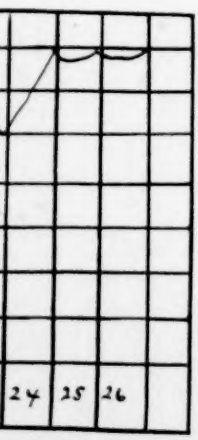


CASE X.

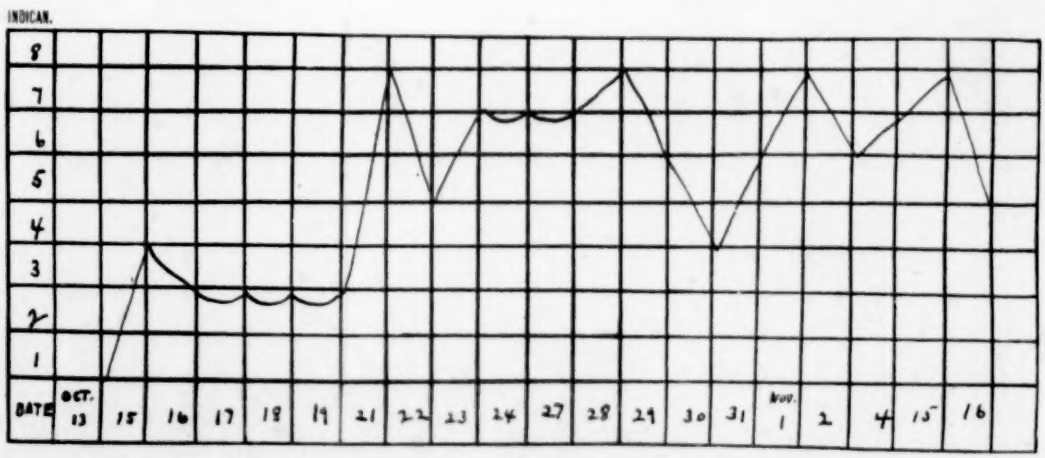
Regular hospital diet. B, Restricted diet and salol. C, Regular hospital diet resumed.



CASE IX.



egg diet resumed.



CASE XIII.

Depressive condition

traces with a stationary weight. There was twice a well marked acetone reaction in Case 20, and with a gain of 1 lb. In Case 22 there was a decrease of 9 lbs. in weight, and the urine contained acetone three times and diacetic acid once. Although it was practically impossible to weigh the patient in Case 23 on account of the bed-ridden condition, yet there was undoubted loss as shown by the clinical course of his disease. Here during the period when little food was ingested, the acetone and diacetic acid reactions were marked, but after tube feeding had been begun they gradually diminished in amount until both became entirely absent. In all, they were found present six times. In Case 25 there was a loss of 1 lb. in weight, and in the urine of this patient acetone was detected three times and diacetic acid once. In none of my other cases, whatever the clinical condition, could either of these bodies be detected. It will be observed that in all of the cases cited, with three exceptions (13, 18 and 20), there was some loss in weight. We can therefore be reasonably certain that the appearance of both acetone and diacetic acid can be referred to an abnormal metabolism, due to the inanition process, even though all of these cases, with one exception (Case 18), were either depressive or akinetic conditions. In the other cases, showing stupor, depression or akinesis, these two bodies, with the exception cited above, were constantly absent, unless there existed a decline of the body weight. In the manic condition, acetone was detected but once (Case 18), and here it is impossible to account for its presence or significance. In one of my cases, associated with fear, acetone was absent (Case 19), in the other it was present in traces three times, but here also there was some loss in weight. I have failed to detect the large amounts of acetone or the relation thereto in cases associated with fear, as pointed out by Marro. Having the above inanition-process in mind, auto-intoxication as a factor in producing akinetic conditions, manifested clinically by the appearance of acetone and diacetic acid in the urine, can be definitely ruled out.

In concluding, I wish to express my thanks to Dr. Meyer for many important suggestions, and to the various members of the hospital staff for placing valuable material at my disposal.

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STUDIES IN THE MANIC-DEPRESSIVE INSANITY, WITH REPORT OF AUTOPSIES IN TWO CASES.

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Since the appearance of Stahl's[1] dissertation the significance of the apparent periodicity characterizing the recurrence of certain forms of alienation has been the subject of frequent discussion, and various opinions have been entertained as to the proper degree of importance to be attached to it. Pilcz,[2] in his recent monograph, holds that for practical reasons it is still necessary to consider the more or less periodic recurrence of certain forms of insanity as the most important distinguishing element in their symptomatology. On this assumption he groups together under one head not only the circulary insanities, periodic types of mania, melancholia, amentia and paranoia but numerous other indefinite symptom-complexes. Such a method of grouping is the logical outcome of the opinion held by Hitzig, Jolly and the majority of English and American alienists, that it is justifiable to class together those forms of mental disorders that have a tendency to recur with more or less regularity provided that the symptoms of each attack in the order of their sequence bear a quantitative as well as a qualitative resmblance to those which have occurred in previous seizures. Kraepelin, as is well known, was one of the first clinicians to oppose this view. He holds that there is no good and sufficient reason why clinicians should feel bound to select the apparent periodicity of the recurrence as the determining and differentiating factor in the study of these

[1] De affectibus periodicis, Dissertatio inauguralis, Hallae, 1701.
[2] Die periodischen Geistesstörungen, Jena, 1901.

forms of alienation. Excluding the group of symptoms which are diagnostic of dementia praecox Kraepelin describes under the head of manic-depressive insanity the circulary and periodic insanities together with the simple recurrent manias and melancholias. According to this conception the various symptoms occurring in these conditions are merely the expression of a single morbid process, although it is admitted that the closer study of cases may ultimately result in the exclusion of some that are now brought together under this head.

In studying the various forms of alienation which are thus grouped together as manic-depressive insanity the protean character of the symptoms is at first sight confusing, but patient observation has shown that it is possible to distinguish certain fundamental characteristics in all the cases. From the forms of simple mania in which the patient suffers two or three seizures during a lifetime to the well developed attacks of periodic insanity there are all grades of cases. By careful and systematic comparison not only of the individual attacks with each other, but also of the different cases it is possible to detect the presence of symptoms which form the basis of a common clinical complex. The more carefully the clinical picture is studied the more it becomes evident that variations in the disease are due much more to quantitative than to qualitative changes of individual symptoms. These observations tend to strengthen the belief that the intimate clinical association existing between the periods of maniacal excitement and depression is frequently ignored.

The clinical manifestations of cases of "mania" and "melancholia" presented in many of the text-books on insanity are, as Adolf Meyer has said, decidedly impressionistic. In the endeavor to give the student a composite picture only the supposedly salient features of the case have been pointed out, and little, if any, systematized attempt has been made to study the variation in the physical symptoms that occur at the onset of the disturbance, at the time of greatest excitement or depression, as well as during the period of subsidence. Clinical psychiatry is rapidly emerging from the stage when the impressive use of such terms as mania and melancholia can be resorted to as a subterfuge to divert attention from the real ignorance that exists regarding these conditions. Nor is it sufficient to substitute the word

excitement for mania or depression for melancholia; the clinical history must state in detail the symptoms that characterize each period. The alienist may call attention to certain manifestations which occur during a mania or melancholia as of diagnostic or prognostic importance, but any attempt on his part to consider these two terms as indicative of specific disease-entities smacks of casuistry.

The more or less casual observation of patients during an attack of excitement or depression often forms the basis of a generalization regarding these conditions which serves to emphasize the apparent but essentially fictitious oppositeness. A daily study of these patients, no less careful than that bestowed in the wards of a general hospital upon cases of typhoid fever or pneumonia, with the noting of even slight changes in the symptomatology lessens the tendency to consider these conditions as antithetical. Nor can it fail to elicit the fact that many of the symptoms commonly associated only with the period of depression are present during the maniacal attack, and conversely, all of us have met with instances in which the symptoms of maniacal excitement subside and are replaced by those of the depressed stage in such a gradual way that it is impossible, at any rate with our present methods of clinical study, to state when one period has terminated and the next has begun. The relationship of the two conditions is also strikingly emphasized by the careful analysis of the symptoms in cases usually classed as instances of "simple mania." There are few clinicians who would be unwilling to admit that simple mania is a very rare form of alienation. Even in the comparatively few cases which come under observation for a sufficient length of time is it possible to detect either preceding or subsequent to the maniacal excitement, a period of depression. It must be borne in mind, however, that on account of their evanescent character the symptoms of depression may escape detection. Even those who reject as untenable Kraepelin's conception, that the manic-depressive insanity is a clinical entity, must admit that by redirecting attention to the intimate clinical relationship of the periods of mania and depression he has emphasized the necessity of making more detailed and careful inquiry regarding the determination of the objective expression of these conditions.

The history of the following cases are of interest inasmuch as they serve to indicate clearly the homogeneity of many of the physical symptoms that occur in the attacks of mania and depression.

Case I.—Mrs. X., aged 35, admitted to the Sheppard and Enoch Pratt Hospital, December 12, 1901.

Family History. The father had a violent temper. The brothers and sisters were "eccentric."

Personal History. The patient herself developed normally and was well and strong up to her 20th year when she had an attack of typhoid fever. Following this illness she suffered from what her physician called "mild attacks of mania." The mental disturbances lasted for two months, after which time marked aberration disappeared, but the patient was decidedly neurasthenic, giving, at times, evidence of mental depression, while at other times her sense of well-being seemed to be somewhat exaggerated. This point in the history is of interest as it shows the alternation of the periods of mild excitement and depression. Since the attack of typhoid fever the patient has had a peculiar facial action when talking. A more detailed description of this symptom cannot be obtained. The patient has been married for eight years; has had two children, the last five years ago. The first was still-born. Since the birth of the second child the patient has had one miscarriage, the cause of which was unknown. Apparently gestation did not affect her mental condition. Two years ago following measles a second attack of mania occurred, from which recovery was slow.

The present attack began about three weeks ago with loss of appetite, sleeplessness and a feeling of soreness in her head, but no definite headache. The patient became very excited while attending a church service and was very solicitous about the salvation of her husband. On retiring one night she insisted that she was suffering from "an attack of typhoid fever," affirming that she could smell the fever; but no further history of definite olfactory hallucinations was obtainable.[3] No fallacious auditory or visual sense perceptions were observed. Her disposition changed;

[3] Kirn and Mendel have reported instances of disturbances of the sense of smell during maniacal attacks.

she became depressed, cried a great deal, reproached her friends, and was afraid of being left alone, particularly in the dark. At the end of about a week she became excited; cried, laughed, sang, talked, and refused food; there was constant motor restlessness. These periods of excitement alternated with periods of quiet. At times the condition would clear up considerably and the patient would answer questions coherently. Occasionally she has been quarrelsome; has slapped and interfered with people who did not do as she wished. She has made two attempts at suicide.

Since admission the patient has almost constantly been under restraint; she talks incoherently about her husband and religious matters. There is a marked tendency to rhyme and apparently she has had visual as well as auditory hallucinations. At intervals, when she has become quieter, she has refused to answer questions in detail saying that the law did not permit her to do so; but these ideas are transitory. In a few minutes she apparently has had no recollection of what she has said. It is interesting to note the rapidity with which the emotional state changes. One instant she laughs in a silly manner and the next she begins to cry. The examination of the chest and abdomen shows nothing abnormal, with the exception that the heart's action is of a neurotic type. The sounds are accentuated, the pulse-rate being 100. The patient's weight on January 4th was only 78 pounds; the muscular strength is generally poor. The character of the muscular efforts made by the patient are of interest. She can be made to squeeze the examiner's hands with fairly good grip for about five seconds, but after this time the muscular contraction gradually relaxes and all pressure disappears in about fifteen seconds. The knee-jerks are active. At times she seems to recognize persons in the room, but cannot recall their names. At varying intervals the tendency to rhyme is particularly well marked. A favorite combination of words is "refuse me" and "excuse me." She makes certain stereotyped movements such as wiping her mouth with her hand. The acoustic-facial and facial-visual reflexes are not particularly active; loud sounds and bright lights produce no marked effect, but percussion with the hammer over the face elicits some hyperaesthesia. The blood pressure varies from 116 to 125 mm. At times there are slight but fairly distinct involuntary and incoordi-

nated chorea-like movements in the muscles of the forehead, face and neck. At one time although the sense of pain over the face and ears was fairly well preserved the legs could be pinched for several seconds without evoking any response, but after a certain lapse of time she would suddenly seem to become aware of the stimulus.

The blood showed 75 per cent of haemoglobin. Urine, 1800 cc. in 24 hours; acid, specific gravity 1005, distinct trace of albumin, no sugar or bile. At one time the indican was increased; at the second examination it was not above normal. The first examination showed several granular-hyaline casts; on examination of a specimen obtained several days later none were found.

Case II.—A short abstract history will suffice to bring out even more prominently the rapid alternation of the symptoms of excitement and depression in the earlier stages of the disease. The patient is 24 years of age, unmarried. The family history is negative for nervous and mental diseases. The patient has suffered from mild attacks of parotitis, rubeola, and scarlet fever. There is no history of chorea, chlorosis, insolation or traumatism. The catamenia appeared at 15. The patient is usually depressed at these periods. She began to go to school when she was about 8 years of age; she is said to have been ambitious and diligent; "she often seemed absent-minded and dreaming, particularly in the evening." She has always been very musical. The first definite attack of depression was noticed in September, 1897. She became interested in a festival, and thought that the responsibility for the success of the entertainment rested upon her. Gradually she became more and more depressed. She went to a sanitarium in October, 1897, and was discharged cured May, 1898. A few days after returning home she became very vivacious and quite markedly excitable. She was unusually disturbed by the death of a friend. Toward the end of the month the excitement increased. She claimed to have seen visions, and affirmed that attempts were being made to poison her. Her conversation became rambling and extravagant; she was sleepless, and her appetite became capricious. On admission to the hospital she was noisy, talked incessantly and incoherently, and showed some tendency toward impulsive acts.

Physical examination: The heart and lungs appear normal;

there is no increase of cardiac or hepatic dulness. The knee-jerks are very active; the other tendon reflexes are not markedly increased. Haemoglobin 75 per cent; leucocytes 7000. The pupils react actively to light both directly and consensually; also on accommodation. Dermatographia is present, a diffuse line of erythema developing gradually and being fairly persistent. The patient's memory is good. The association of ideas is rapid and bizarre. She is emotional. Her moods are unstable, talking, singing and crying alternating in quick succession. She shows marked suggestibility, and a tendency to translate into words the first idea tnat enters her head. Rapid changes in the facial expression are very noticeable, as are the contractions of the muscles of the forehead and eyes. Sudden loud clapping of the hands before her face causes her to start, but not nearly as much as would be the case in a nervous patient with a normal degree of consciousness. The lingual musculature is actively brought into play. She often protrudes her tongue, presses it against her teeth, etc. Occasionally stereotyped expressions are used. On several occasions it is noted that the right palpebral space is wider than the left and the right pupil is larger than the left. The characteristic feature of the case is the rapid alternation of moods.

The history of the onset of the attack shows clearly that the periods of depression were followed by symptoms of excitement. A careful study of patients during these early stages in the development of the manic-depressive insanity is desirable in order that the genetic conditions may be better understood. The opportunity for such investigations is seldom possible in the wards of a hospital for the insane as the attack is usually far advanced when a patient is admitted. It is important for this as well as other reasons that alienists should be associated more intimately with the work in the neurological dispensaries when they are likely to have frequent opportunities for studying cases in the early stages.

The symptoms in a third case are worthy of study inasmuch as on close analysis it proves almost impossible to differentiate them individually from those observed in the preceding patient, although at first sight the clinical pictures of the two conditions have little in common. The former was restive, showed a

marked degree of motor excitement and rapidly changing moods. In the latter the motor restlessness was more or less concealed, but was not totally absent; the patient was apparently depressed most of the time and this mood only very occasionally gave way to another.

Case III.—The first attack of alienation occurred eight years ago; the second, two years ago, while the present attack began in November, 1901. The most characteristic symptom was that of depression. On admission the patient was somewhat emaciated and anaemic; the facial expression was set and gave evidence of anxiety. Muscular movements were very slow and uncertain. The pupils were dilated, the left excentric, placed somewhat above its normal position, the right was normal; both reacted to light and on accommodation. The deep reflexes were normal. The blood examination showed 65 per cent of haemoglobin; leucocytes 7000. The urine had a specific gravity of 1020, a trace of albumin; the indican was increased. The blood pressure was 133 mm.

It was difficult to obtain the patient's attention. When asked to stand up she made a slight attempt to rise but did not get up. The impression conveyed by this to the observer was that the motor process was interrupted by an inflow of new associations which confused the patient.

The symptomatology of the period of depression differs from that of excitement to a great extent either because in the former condition the motor impulses are not sufficiently strong to compel action on the part of the patient or it may be because there is a milder degree of cortical irritation with less tendency for the impulses to discharge themselves. The alienist frequently uses the term inhibition loosely to designate an active definite process. Physiology, however, has taught us that the terms inhibition and depression must not be confused although the two conditions often resemble each other in their external features. It must be clearly borne in mind that the expression of an exciting stimulus is inhibited largely by the occurrence of antagonistic processes. If these processes are sufficiently strong to compel their expression the patient shows signs of maniacal excitement. If, on the other hand, the strength of individual processes is less or the degree of cortical irritation not so marked the symptoms of depression may result.

A careful comparison of the histories of these three cases fails to elicit any evidence in justification of the assumption that the periods of excitement and depression may be contrasted in so far as regards the existence of fundamental differences in their symptomatology.

It is only in a very limited sense that the two conditions of excitement and depression may be considered to stand in sharp contrast to each other. If we agree with Wernicke and consider mania to be a symptom-complex, the result of intrapsychic superfunction, and the period of depression as a state of diminished function, the two conditions when viewed from this standpoint may logically be looked upon as antithetical. Careful clinical study, however, does not support the view that the symptoms of mania are those of superfunction. Although it may be admitted that the prominent feature of mania is the result of an increased excitement of the central nervous system, this does not mean that there is necessarily an actual rise above the normal of all the functional activities. It is easily demonstrable that the periods of greatest motor excitement may or may not be accompanied by a corresponding increase in the activity of the sensory functions. The patients may show signs of psychosensory superproductiveness without many motor disturbances. This latter condition is often observed toward the close of a period of maniacal excitement. Patients are frequently said to exhibit symptoms that suggest a superactivity of certain cerebral functions, but on closer study the clinical picture is seen not to be a composite one due to the occurrence of symptoms attributable to increased or diminished functions. On the other hand there is such an intense but limited exaggeration of certain functions that there is a considerable total reduction in the associative processes. The composite pictures which many authors have given us of the period of excitement in many instances undoubtedly convey the impression that the symptoms are those of pure superfunction. Such a view is incompatible with the facts, as we know them, of the physiology of the brain. If it be true, in a general sense, that the only specific function of the brain, or certain parts of it which we have been able to find, is "the activity of associative memory," the reason for this dissent from the commonly accepted views regarding the symptoms of

mania becomes apparent. The highest development of any cerebral function is present only when the contingent associative processes are normal. If one of the factors in the chain is relatively exaggerated so that a sejunction of the normal associative mechanism occurs the sum total of all the processes making up the intellectual act is diminished. Robertson's statement that "the increased morbid capacity for comprehending the environment greatly complicates the symptoms of mania" can hardly be substantiated. One is often impressed in studying cases of mania by the fact that the acoustic-facial or acoustic-visual reflexes are short-circuited, but my own observation has convinced me that although their intensity may be exaggerated the actual associative mechanism of the brain is so disorganized that there is a decreased and not an increased power of comprehension. As proof of this may be cited the fact that in all cases of maniacal excitement the voluntary attention of the patient is seriously disturbed.

Many observers have referred to the apparent increased power of perception in cases of mania. The reason for this belief is probably to be explained by the fact that clinicians have been misled by the increased tendency exhibited by patients to give immediate expression by word or action to every new idea. The instability of the voluntary attention of patients and their inclination to immediately translate their thought processes into some form of action often suggests a rapidity and complexity of the intellectual powers which in reality is far from existing. My own observations have led me to believe that the perceptive processes may be at their lowest ebb synchronously with the period of greatest motor excitement. Toward the close of this period, when the motor excitement has partially subsided, there is often a time when hyperaesthesias can be demonstrated. Occasionally the supersensitiveness to peripheral stimulation becomes marked when the patient's capacity to direct and fix the attention has regained its normal value. Several observers have called attention to the similarity that exists between many of the symptoms produced by the effects of alcohol and those that occur during the period of maniacal excitement. Bonhoeffer, Kraepelin and other investigators have shown that in alcoholic delirium there is a marked weakness in the associative processes, al-

though there may be a psychosensorial superproduction. Even this superproduction is, I believe, limited in extent.

Recent clinical observations apparently justify the statements of Meynert, Wernicke, Friedmann and others to the effect that in the study of the symptomatology of maniacal conditions we have to consider the effect of an active stimulus as well as of a paralyzing agent. These two factors are said to stand in causal relationship to each other and tend to strengthen the belief of certain clinicians in the truth of the law of psychical antagonism as enunciated by Friedmann, who says that no psychical function is increased without impairment of other mental powers. It is probably true that the apparent acceleration in the psychical reactions of alcoholic patients may be attributed to the increased power of transmission of the psycho-sensory impulses with a defective power of association.

Careful clinical study of the conditions which we have hitherto called mania and melancholia shows that it is inadvisable to use these terms to denote disease entities. Even in well developed cases of maniacal excitement it is impossible to regard the symptoms as antithetical to those seen in melancholia.

The apparent change in the personality of patients which occurs during the periods of excitement often deceives the casual observer. This is apt to be the case in all the milder forms of maniacal excitement, particularly those described by Hecker under the head of cyclothaemia. It is often possible during the period of exaltation to demonstrate a limitation and diminution in the intensity of the perceptive processes. The insensitiveness of many patients to touch, pain and cold during a period of motor excitement is frequently very noticeable. The following extract from the history of a patient illustrates these points in the symptomatology:

Case IV.—A woman, 34 years of age, has been under observation at the Sheppard Hospital for several years. She has suffered from attacks of maniacal excitement and depression since 1892. During the present attack, which has already lasted a month, and from which the patient has not yet entirely recovered, there have been frequent periods of comparative quiet. The change from a condition of quiet to that of violent excitement is often very abrupt. During the quiet days the patient is often very drowsy, sleeping the greater part of the time; some-

times, indeed, she experiences great difficulty in holding her eyes open even while she is being fed. During the month of January there were ten days of marked excitement, thirteen days during which she was in a drowsy semi-stuporous condition and eight days of comparative quiet and rationality. On one day during the present attack when spoken to the patient became greatly excited, began to talk very rapidly and confusedly and did not take her eyes away from the person who first spoke to her. It is difficult to say whether the condition was the result of the reaction of the auditory or of the visual stimulus. When the maniacal excitement was at its height the patient's foot could be pinched hard without causing any apparent reaction. Pain sense over the face and arms was also diminished.

It has frequently been noted that as soon as the nurse or physician approached patient's bed she became greatly excited; though held in bed by a camisole she would begin to struggle violently, shouting and declaiming; the facial expression indicating anger, the eyes staring, the lids somewhat retracted. The flow of words, which it is often difficult to understand, was frequently broken by stereotyped expressions. During the attack the eyes, always prominent in their sockets, seem to become more so. There is retraction of the upper lids similar to that observed in many cases of Graves' disease. During the intervals of quiet no evidence suggesting disturbance of the thyreoid can be detected, except, perhaps, the slight prominence of the eyes. At the termination of one of the excited periods, Dr. Farrar noted that the left pupil was larger than the right. Neither pupil seemed to occupy the centre of the iris, the upper rim of which was narrower than the lower. On the following day this condition of the pupils was less marked. The reactions were very active, the size of the pupils constantly changing. This inequality has been noted a number of times during subsequent attacks.

According to Pilcz, symptoms of paralysis of the sympathetic are frequent during the periods of maniacal excitement. Differences of the pupils have been noted in a number of cases; while in a few instances there is sluggish or complete absence of the pupillary reaction. The interparoxysmal pupillary difference has been noticed by various observers (Schötz,[4] Ball,

[4] D. I., Berlin, 1877, Beitrag zur Kenntniss der periodischen Manie.

Régis, Gauster,[5] C. Mayer,[6] v. Wagner,[7] Mendel and v. Krafft-Ebing).

The onset of the attacks in this patient are somewhat sudden. She may pass from a period of quiet to one of great excitement in an hour or two. Generally the first symptom of the approaching attack is an inability to sleep well. She often complains of a sense of heat and discomfort in her head and frequently of hearing voices. Occasionally she thinks she hears the voices of the doctors and the nurses as if they were in distant parts of the building. Among the first premonitory signs of the onset of a period of great excitement are certain impulsive acts. The patient has a tendency to break anything within her reach—mirrors, chairs, etc., and to assault nurses or physicians. After the acute symptoms have subsided, the patient has a fairly good recollection of what has happened. She often remembers hearing voices, and frequently claims to understand what animals and birds say; at times the wind seems to her to have a voice. She thinks that although the voices have the semblance of reality they may be due merely to her imagination. She feels better when she does not hear or understand the voices, as they give her a strange sensation, although they do not give her commands or directions, and do not influence her actions. She can give no explanation for the impulsive acts except that she is unable to resist them.[8]

In the present, as well as during the former attacks, a marked diminution for the pain sense during the period of greatest motor excitement has been noted.

March 3rd. Patient is slowly convalescing after a period of acute excitement. She occasionally follows with her eyes movements of those who may be in the room. She is quiet and somewhat drowsy, but objects to being touched. This apparent hyperaesthesia is in marked contrast to the condition observed

[5] Maschkas, Handbuch d. gericht. Medizin, Bd. IV, 436, 1882. Ueber period. Irresein.

[6] D. I., Würzburg, 1881, Beitrag zur Casuistik d. circulären Irreseins.

[7] Jahrbuch f. Psychiatrie, 1888, Bd. VIII, p. 75. Ueber Trauma Epilepsie und Geistesstörung.

[8] Compare Selbst-Biographie eines Falles von Mania acuta. A. Forel, Archiv f. Psych. u. Nervenk., Bd. XXXIV, 962.

during the time of greatest excitement. She recognizes at once the slightest pressure of the finger and tries to withdraw out of reach. She does not seem to object to loud noises and pays little or no attention to what is said to her.

Case V.—In striking contrast with the disturbances of the sensory functions observed in this case during the period of greatest motor excitement is the clinical picture of a patient now under observation who has suffered from several attacks of excitement and depression. There is marked motor restlessness which becomes greatly exaggerated on the approach of any person. There is no logorhoea. The patient only occasionally utters a sound. The facial expression indicates anxiety and marked mental depression. The brows are corrugated and the corners of the mouth droop. The hyperaesthesia for touch is excessive. The patient struggles violently whenever the face, arms, legs or body are touched. The visual-facial and acoustic-facial reflexes are not exaggerated. Her condition suggests the possibility of a very slight intensification of the stimuli resulting not in an exaggeration of the depression but in the maniacal outbreak. When the patient is touched at any one point the series of movements that follow indicate the immediate spread of the sensory stimuli in all directions so as to give origin to a number of reflex movements. The pathological process, whatever it may be, which has affected the cortical elements, has reduced the patient, for the time being, to a condition in which the reflex protective movements, such as are seen in the earliest stages of infancy, are most pronounced.

A more careful study of patients at a time when such a condition exists is of great importance. Dr. W. R. Dunton has been making a study of these psychical reflexes in dementia praecox, where the effects of visual and auditory stimuli are followed by an immediate sharp, short contraction of certain groups of the facial muscles. My own observations on this point are very limited. As yet I have not been able to observe the occurrence of these reflexes, either following acoustic, visual or a sensory stimulus except at a time when there is a marked diminution in or inhibition of the psychical activities. A study of the cases that have come under observation suggests that the period when the peripheral stimulus is followed by an immediate and exaggerated

psycho-motor reaction is synchronous with the condition of greatest psychical inhibition.

The period of psycho-sensorial superproduction is, I believe, often accompanied by a peripheral anaesthesia. It is, therefore, desirable in cases of maniacal excitement, where the onset is gradual, to determine as far as possible the condition of the cutaneous sensibility. In cases where the onset is abrupt such an examination is, of course, impossible. The study of cases of depression and exaltation cannot be limited to a mere analysis of the mental operations which are supposed to differentiate these two states.

Any general statement to the effect that there is an actual increase in the capacity of the sensory functions during an attack of maniacal excitement is of little value, unless in addition to a detailed account of the patient's condition at that time the preceding or subsequent variations in the symptomatology are all noted.

The cause of the anaesthesias to which reference has been made cannot, as yet, be accurately determined. In certain instances they may be peripherally conditioned, but in the majority of cases the disturbance is doubtless of central origin. As a rule, diminished or impaired sensation may depend in a measure upon the remarkable "fluidity" of the attention.

The alienist is not in possession of sufficient facts at present to justify a general statement regarding the condition of the sense organs during the periods of depression or excitement. Clouston's affirmation that during the periods of depression in cases of circulary insanity there is a dulling of all sensations cannot be substantiated. Foville, Ritti, as well as others, have shown that a condition of hypersensitiveness may intervene.

Pilcz[9] has carefully analyzed the published reports in which reference has been made to the changes that occur in the central nervous system of patients who have suffered from attacks of periodic insanity. He has been able to collect 10 cases in which the existence of definite changes in the brain were not noted. In 17 cases well marked alterations were found in the central nervous system. Pilcz himself, up to the time of publication of his monograph, had not had the opportunity of personally studying

[9] Op. cit., chap. XIV.

the condition of the brain in a patient who had been afflicted with an alienation similar to any one of those forms which he groups under the head of periodic insanity. The following records of two cases, although adding nothing definite to our knowledge regarding the specific character of the pathological lesions, seem to be of sufficient importance to justify their publication.

Case VI.—A woman, aged 40, unmarried, was admitted to the hospital March 26, 1898.

Family History. "The father suffered from melancholia which developed into paresis." He died of terminal pneumonia. Several of his family had nervous affections, probably hysterical The mother and one brother died of tuberculosis. Two brothers are living and well.

Personal History. The patient was born to affluence and raised in luxury. When 24 years old she had several hysterical attacks, lasting about one month. At 28 she became very nervous, and was in a condition similar to that from which she was suffering at the time of her first admission. In November, 1892, she suffered from an attack of abdominal pain which was said by the physician to be neuralgia of the left ovary. Her father had met with reverses and her life had been reduced from one of luxury and pleasure to a humdrum existence. The patient says that she was much worried on account of her father's misfortune as well as by the fact that her mother was somewhat of an invalid. The nervousness increased. One night, just after the onset of her monthly period, she was awakened and saw her father standing by an open window and feared that he was going to jump out. She was greatly shocked. The menses ceased and ever since she has complained of "distress in her pelvic nerves." She was first admitted to the hospital as a voluntary patient June 2, 1893, with a diagnosis of acute melancholia. She suffered from convulsions and hysterical attacks and was pseudo-suicidal. She was discharged in January, 1895, recovered. She remained in fairly good health until November, 1895, when she suffered from a third attack. She complained of pain and of a grating sensation at the tip of her spine and at the base of the brain, with accompanying mental depression.

She was readmitted January 25, 1896, as a voluntary patient, a diagnosis of hysteria being made. At the time she weighed 103

pounds, gained four pounds in two weeks, after which no increase was noted. She had several hysterical attacks characterized by pain in the head, numbness in her legs, mental depression and often imagined that some one was in her room. She had suffered from "one hysterical convulsion" with accompanying muscular twitchings. During this attack her moods were variable; she was often disturbed, noisy, semi-delirious or depressed.

At various times she has complained of strong sexual desires, which, although repellent to her, she fears she cannot overcome.

June 23, 1897. Patient decided to try living at home. She was somewhat better, able to be up and about.

January, 1898. Following an operation for fibroma uteri the patient had several hysterical convulsions. Was treated for six weeks in a private sanitarium, but did not improve. Readmitted as a voluntary patient March 26, 1898.

Stated briefly, the condition on admission was as follows: The patient looked ill and was ordered to remain in bed. She was self-centred and complained of sensory disturbances as on previous admissions. The actions and conversation were very erratic. She was frequently noisy and inordinately restless.

Six weeks after admission the patient became greatly disturbed and was very noisy. She said she could not control herself. The severity of the symptoms shows some slight relation to her monthly periods. During the summer there was but slight variation in her condition.

In October, 1898, the physical state was as follows: In a strong light the pupils are moderately contracted. The consensual light reflex from right to left is not quite as well marked as from left to right. Reaction to accommodation is active. The movements of the eyes and lids are normal. The thyroid gland is barely palpable. There is no von Graafe sign; the tendon reflexes very active. No cloni are elicited. The patient describes states of mental exaltation in which she has hallucinations of smell and says that she can improvise music and write poetry as though inspired. This period of exaltation is followed by one of depression. She has frequently complained of a sickly sweetish taste which she thinks is an hallucination. During November she was appreciably worse. She appeared to be in great dis-

tress; she said that she was in danger of losing self-control, and had all she could do to restrain herself from screaming out, breaking the furniture, and doing herself some bodily harm. The motor restlessness increased. She said that her legs were getting so weak that she had to separate her feet widely in order to avoid falling. She complained of inability to lie on her right side without having a hot water bottle pressed against her right groin in order to keep her viscera from falling out. The speech was somewhat indistinct. At times she hesitated for a word and appeared to have considerable mental confusion.

On December, 15, 1898, patient was found lying on her back in bed with the knees drawn up. She complained that her head hurt her, and that the sound of the piano in a distant part of the ward was intensely painful; that she had a bad taste in her mouth which she later spoke of as a sweet taste. The tongue was coated and tremulous. The pupillary reflexes were active for accommodation; somewhat sluggish for light. There was no pain on passive movement of the head when the attention was directed elsewhere. On being shown a watch and asked to name it, she said she could not see it very well; then added, "It is a watch, I think; not sure until I feel it." She claimed not to see a pencil even when placed within half inch of her eye. The temperature in the axilla was 98°. She had been very thirsty for two days and had drunk a great deal of water. When asked the name of the hospital she said "Moses Sheppard, Sheppard Moses and Sheppard and Moses and Sheppard and Moses."

After repeating these words many times, she began to cry and said her head hurt her. On testing sensation with a pin, she replied promptly at first, but after a few moments her answers became slow and incoherent. The knee-jerks were very active. No clonus. Scratching the sole of the right foot with a pin elicited no response. Scratching sole of left or right foot gave slight plantar flexion. There was slight anaesthesia of the feet. The articulation gradually became more and more difficult. Her speech was very slow and hesitating, uncertain, without inflexion, and, at times, aphasic with a suggestion of verbigeration.

December 20th. Heart: Point of maximum impulse in 5th interspace 9 cm. from mid-sternal line. First sound very loud and booming at the apex with a very faint pre-systolic murmur.

The first sound is not markedly abrupt, but the long pause is greatly shortened. Rate 32 to ¼. There is a suggestion of a thrill over the body of the heart during systole. The cardiac impulse is very powerful. The second sound is clear at the apex. Over the body of the heart and at the base, especially in the pulmonic interspace, the systole is almost occupied by a blowing murmur which seems to begin shortly before the first sound. In the supra-clavicular fossae, especially the left, pre-systolic and systolic murmurs are heard, harsher on the left and entirely filling the systole. Cardiac dullness is not enlarged; relative at third rib, absolute at 4th interspace in P. S. L. The apex beat is somewhat displaced outward. No dullness to the right of the sternum was made out. The pre-systolic and systolic murmurs were heard better in the pulmonic than in the aortic interspace. The pulmonic second is not accentuated. The pulse is regular in force and rhythm.

The face is somewhat cyanotic; the left angle of the mouth is lower than the right, and the right brow is more wrinkled than the left. The tongue is protruded slightly to the right. There is apparently slight incoordination of movements.

Since the middle of December the patient has become more and more confused, taking very little nourishment, continually trying to get out of bed and craving water.

From December 25th she appeared to be unconscious; there was increasing distention, and evidence of much pain in abdomen.

Death at 1.45 A. M. December 27, 1900. The autopsy was made by Dr. Harry Marshall.

Anatomical Diagnosis.—Hypostatic pneumonia, lower lobes, right and left, red hepatization, acute bronchitis, acute splenic tumor, fatty liver, cloudy swelling of kidneys, and absence of pelvic organs. Distended bladder; soft calculi in renal pelves. Arteriosclerosis. Fibrous myocarditis. Mitral insufficiency.

Bacteriological Diagnosis.—Lung; pure culture of pneumococcus. Kidney and spleen each contain two organisms, one the colon bacillus, the second a small actively motile unidentified bacillus.

The result of microscopical examination of the central nervous system was as follows: In the cerebral cortex there was no increase of the neuroglia, no evidence of mitoses in sections stained

by the Weigert mitosis stain; no sclerotic areas. In sections stained by the Nissl methylene-blue method, the nerve cells, particularly the larger elements, showed the characteristic "fever change," the whole cell being stained homogeneously, and the differentiation between the chromatic and achromatic tracts scarcely visible. The cell process could be followed much further than is the case under normal conditions.

A study of the fibres of the cortex by means of Marchi and Weigert-Pal methods did not give any evidence of degeneration. In the cortical areas examined, frontal, anterior, posterior, central, parietal and para-central lobes, no evidence was obtained of any focal lesion. There were no degenerations in the cord other than the fever changes as already noted in the cortex.

Case VII.—The patient was admitted to the hospital December 20, 1900; unmarried, aged 45.

Family History. The mother and father were first cousins. The latter died of Bright's disease, aged 62. Mother living and well; one brother and one sister living and well; one brother living has attacks of mania; one sister dead suffered from maniacal attacks.

Personal History. Always healthy as a child; at 13 had a bad fall. Was picked up in an unconscious state and suffered from the effects of the injury for a year. Three years later she was much disturbed mentally by the unexpected arrival at home of her brother who was insane. Soon after she had her first maniacal attack, which lasted three weeks. A second attack occurred two years later and was much more severe, the patient being acutely maniacal. Frequent attacks followed. At 32 years of age she was engaged to be married, but the engagement was broken, as the mother informed the patient's *fiancé* of the nature of her daughter's malady. She was first admitted to the Sheppard Hospital May 7, 1897. The attack which necessitated confinement in the institution occurred shortly after seeing her *fiancé*. On admission the patient was restless; her conversation was slightly incoherent. She was somewhat untidy in her dress. Complained of insomnia and anorexia. There were no suicidal or homicidal tendencies. She gradually improved and was discharged July 29, 1897, after being in the hospital for 2¼ months. She continued in about the same condition until March, 1898,

when she began to show symptoms of an acute attack, and returned to the hospital as a voluntary patient March 26, 1898, after a lapse of eight months. She was somewhat confused, but able to recognize those whom she had known before. At times she was quiet, while again she would show great motor excitement, kicking her nurse, trying to bite herself, making a great deal of noise and pounding on the floor. After two months she began to show signs of convalescence and was discharged July 7, 1898. She continued in good health until January, 1899, when she had her first prodromal symptoms.

She was admitted to the hospital for the third time January 9, 1899. She had numerous attacks similar in character to those already noted, characterized by mental confusion and motor restlessness, alternating with periods of quiet. She was discharged May 8, 1899, being able to go home unattended. She was readmitted for the fourth time October 28, 1899, and discharged April 22, 1900.

She was readmitted to the hospital as a voluntary patient December 20, 1900. She had to be put to bed and restrained with a camisole. On examination the following notes were made: A woman of large frame, with an excessive panniculus. Head large and forehead prominent. During the examination she was not noisy. Took some notice of those about her, following with her eyes any one who moved across the room and keeping them fixed on any person who addressed her. She would immediately turn her eyes and head in the direction of any one who asked her a question. She recognized one member of the staff, but not the others. In speaking to those about her she generally used a different name each time. After being repeatedly questioned she was able to give her full name. Orientation poor. She said she was in the "Sheppard Hospital, near England, in Baltimore by local option." She knew where her home was, and said that she had been in the Sheppard Hospital before. Orientation in time was fairly well preserved. The month of the year was correctly given. When asked where she was on New Year's day she replied, "I was in the other room downstairs in the family vault;" when the question was repeated, "In God's hands like everybody else." This was said apparently in jest. Occasionally she asked about the condition of other patients. She admitted that she

was ill and said that she came to the hospital because she thought that she would improve more rapidly than at home. There was no stereotypia or negativismus. When the camisole was loosened, patient immediately attempted to sit up in bed. Speech was not affected, the tone of voice was subdued, but she spoke fairly rapidly. Every change in emotion was accompanied by corresponding changes in the facial expression. The patient's inability to fix her attention, as shown by various tests, was greatly impaired. There was no marked hyperaesthesia of the somatopsychic consciousness. Careful examination of the cranial nerves showed no disturbance in function. The direct and consensual light reflexes were active. The accommodation reflexes were also active; the facial innervation was symmetrical; the tongue was tremulous. The patient relaxed her muscles well, so that the deep reflexes were easily tested. Both knee-jerks were slightly exaggerated; the radial and triceps reflexes were active.

Heart: The impulse could not be felt owing to thickness of the fat. At the apex the first sound was not loud; it was a trifle shortened and partially replaced by a soft smooth murmur, not heard on approaching the axilla and not constantly over the body of the heart. The aortic second was accentuated. Apex apparently not displaced outward. Pulse 51 to the half; good in volume, regular in force and rhythm.

About a week later the patient became very impulsive and attempted to strike the nurse. She tore the bed sheets, and had a habit of whining and contracting her brows. She remarked once that she would make a very good court fool, and that they ought to have plays in the hospital with her for the fool.

The blood examination showed 73% of haemoglobin. Towards the middle of February the patient became more excitable, and their was marked rise of temperature on February 10th. She became more excited and more difficult to restrain until the 12th, when she became much quieter, apparently owing to exhaustion, and died on February 14th, 1901.

The autopsy was performed about twelve hours after death. There were several small areas of broncho-pneumonia in both lungs. Weight of spleen 60 grammes. Liver, weight 1014 grammes. The two kidneys weighed 200 grammes; there were numerous adhesions between the capsule and the organ.

Unfortunately the full notes on the condition of the internal organs have been lost with the exception of those on the examination of the brain.

On removing the skull the cerebral vessels were all found to be intensely engorged. The dura was adherent to the inner table of the skull over both frontal regions. Several depressions were noted between the convolutions, in which pockets of fluid were contained between the pia and arachnoid. There was one such depression over the right parietal lobe. The arachnoid was opaque, the opacity being much more marked in certain areas than in others. The medullary substance was very soft and the differentiation was poorly marked.

The microscopical examination revealed the following changes in the cerebral cortex. Sections were stained by the Nissl, Marchi, Weigert-Pal and Weigert-mitosis strain. There was a slight increase of the neuroglia elements in the cortex. Here and there a mitotic figure was seen. The nerve cells showed the various stages of the acute cell change. Further than this there was nothing of specific interest. No definite lesions were discovered in the basal ganglia. There were no vascular changes.

In regard to the history of injury in the second case it is interesting to note that Pilcz supports V. Wagner's views that the effects of trauma, as well as of the organic brain disease must be considered aetiological factors in the genesis of the periodic psychoses. Moreover, as Pilcz has suggested, the clinical forms in which there is a history of definite lesions affecting the brain tissue seem to be closely connected with the epileptic mental disturbances. Recent writers affirm that a congenital or acquired predisposition does not seem to be a factor of etiological importance sufficient to produce the psychical symptoms of the disease, the additional agency of an external exciting cause being necessary. The secondary or determining factors are discussed at length by Pilcz.

Much has been written regarding the importance of the family history in the cases of so-called periodic insanity. Certain clinicians, as for instance, Morell, have gone so far as to describe the *folie circulaire* not as an independent disease, but as a special form of the *folie héréditaire*. Although the hereditary factor is a prom-

inent one in many cases it is impossible to accept so broad a generalization.

It has recently been noted in a comparatively small number of cases that the maniacal depressive insanity has a greater tendency to recur in families than has dementia praecox. It has even been suggested that this fact may be of importance for the differential diagnosis.

No attempt has been made in the present paper to give a general statement of the reasons for affirming that the maniacal depressive insanity is a clinical entity. There is only one way in which an observer may satisfy himself in regard to the correctness of the views held by Kraepelin regarding this form of alienation. (1) By familiarizing himself in detail with Kraepelin's published views, which unfortunately are not well understood either in this country or in England. (2) After the clinician has grasped Kraepelin's conception, he must then attempt by the careful analysis of cases to see how far this belief is supported by facts. The study of isolated clinical pictures such as are commonly given in text-books is misleading, and serve only to emphasize an apparent antithesis. Each case must be studied carefully during the whole course of its development. The present paper merely pretends to call attention to the fact that at present such general terms as mania and melancholia are merely the *x's* and *y's* in the problem, and that the use of these symbols is permissible only when the clinical history gives some definite clue to the values which they represent. The relativity of these terms must become apparent to any observer who will study carefully the varying phases of cases which come under his observation. In all cases during the period of excitement symptoms generally associated with the state of depression are demonstrable and the converse of the problem is equally true. We are not yet in possession of sufficient facts to warrant the formulation of a law regarding the genetic relationship of the symptoms which give on the one hand the clinical picture called mania, or on the other, that of depression. The continued use of these terms in an indefinite and abstract sense merely signifies that the era of dogmatism in psychiatry has not yet come to an end. It is only reasonable that the alienist in using all terms which have a relative value should be asked to indicate the conditions to which the

terms are applicable. When an observer calls a certain condition mania, it is obligatory that he should tell us not only that there are psycho-motor disturbances, but also describe the character and intensity of these phenomena. He must answer the questions: Are the motor disturbances general, are they limited to the speech centres and how far do these disturbances correspond with defects in motor consciousness? The same is true regarding the psycho-sensory disturbances in function. Although it is often difficult during the periods of great excitement to examine a patient in detail, by the exercise of patience it will usually be possible to elicit certain important facts which give the observer a clue as to whether the sensory phenomena are centrally as well as peripherally conditioned.

It is particularly important at present that more extended observations should be made (1) regarding the variations of the blood pressure and (2) regarding the changes in the urine during the periods of excitement or depression. Although the pathological investigations do not promise to throw any definite light upon the nature of these conditions in the near future, there are certain points to which the attention of the pathologist should be directed. It is incumbent upon those having an opportunity of studying the central nervous system in patients who have suffered from maniacal depressive insanity to determine whether there are any local foci in the brain which may be a source of irritation. These areas may be referred to the effects of trauma or to diseases such as typhoid fever, meningitis, measles, scarlet fever, etc. If it be true that the periods of depression are associated with a rise and those of excitement with a lowering in the blood-pressure, more definite knowledge regarding the mechanism of the cortical circulation is of prime importance.

Closely associated with these questions is the determination of the functional nature of the various cellular elements. Do the disturbances in the sensory functions depend upon alterations in the cells in the outer layers of the cortex, and are the motor symptoms referable to structural alterations in the cellular elements in the deeper layers? Unfortunately at present any theory regarding the specific functions of the cellular elements of the cortex is of value only as a working hypothesis. Undoubtedly some important facts regarding the beginning structural altera-

tions in the cortical cells will follow the study of the so-called achromatic tracts in the nerve cell. The early structural alterations which probably occur in the nerve cell in cases of maniacal depressive insanity are to be sought for in the tracts which until this time have not been investigated.

In conclusion I wish to thank Drs. W. Rush Dunton and C. B. Farrar for the aid that I have received from them in the preparation of this paper.

Medico-Legal Notes

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Immigration of the Defective Classes.—Public opinion has been recently so aroused and such a strong impulse given to the subject that the merits of this question will undoubtedly have greater recognition than ever before. The freedom of the individual, which is involved, and the problems connected therewith, have hitherto, for political reasons, made it difficult to secure proper legislation.

Those whose duty brings them in contact with the defective classes realize how important it is that greater restrictions should surround the admission of undesirable immigrants. Persons entrusted with the inspection of newly-arrived foreigners, those interested in the study of social economics, or connected with the administration of institutions for the care of the dependent and criminal classes, as well as those engaged in public and private charities, in the service of outdoor departments of hospitals and in the relief of the poor, recognize perhaps more clearly than others the need of greater vigilance and of improved methods of exclusion. The magnitude of the evils attendant upon lax immigration laws, the resulting menace to our free political institutions, the drain upon our treasury, the deterioration of morals and of the physical development of the American race, have become exceedingly great. We should be negligent of duty not to consider the welfare of the country at large as paramount. There always will be differences of opinion as to the details of any exclusion act, but the temper of general sentiment at the present time is such that legislation must be productive of actual remedial results in order to meet with public acceptance. A thorough debate upon the subject is desirable, but any postponement, upon political or other grounds, of the enactment of a suitable law, would certainly meet with disfavor. The exist-

ing evils have been too long endured to be allowed to continue without a further and a more efficient attempt at correction.

Under certain restrictions, all persons who are mentally incompetent, or who are morally depraved, or afflicted with certain forms of physical disease, should be excluded. A bill now before the United States Senate provides for the establishment of an immigrant fund by the collection from the transportation companies of a tax upon every alien passenger from a foreign country, excepting Canada and Mexico. All idiots, insane persons and paupers, persons liable to become a public charge, as well as those afflicted with a loathsome or dangerous contagious disease, are excluded. Some judgment must be exercised in the enforcement of the latter provision, however. The enactment of unreasonable restrictions by local health boards of various States concerning consumptives has shown the need of proper discrimination in at least one direction. There is no reason why such persons, if possessed of means sufficient to prevent their becoming public charges, should not travel or reside in favorable localities, under proper sanitary regulations, if in search of health. The interpretation of this section of the law, however, is left to a board of special inquiry, whose decision as to the nature of such disease, based upon a certificate of a medical officer of the United States Marine-Hospital Service, shall be final. The bill further aims to exclude criminals who have been convicted of a felony, or of other crimes involving moral turpitude. Too often our country has become an asylum for persons of this class, who either voluntarily seek our shores as a refuge, or are aided to do so as a means of ridding foreign countries of the habitual criminal. Prostitutes are included in this category. The same section proscribes anarchists, or persons advocating the overthrow of all government and forms of law and the assassination of public officials. Herein exists the chief urgency of stringent measures for the protection of our republic, and in this provision lies the moving spirit which will lead to the enactment of this bill. Secretary of State John Hay, in the memorial address recently delivered upon President McKinley, said: "Our minds cannot discern the origin nor conceive the extent of wickedness so perverse and so cruel; but this does not exempt us from the duty of trying to control and counteract it."

As testifying to the spirit of the American people, several bills on the subject of anarchy have been introduced in the legislatures of the various States. In our National Congress another and a separate bill, in addition to the one upon immigration in general, has been introduced. It provides for the exclusion and deportation of alien anarchists. Methods are provided by pertinent questioning as to the antecedents of a suspect, or his common reputation as an anarchist may be accepted in evidence as to his character. Even if such a person has been allowed to land, a warrant may be issued and proceedings taken for his deportation. Should any alien be convicted of a crime, and should it appear from the evidence that such is an anarchist, like proceedings may be held. The bill provides for the appointment of immigration agents to go abroad and there to make inquiries pertaining to intending emigrants, especially as to their history as anarchists or criminals. No doubt such inquiries would develop the fact that many so-called anarchists are lunatics. The same intense egotism is developed in them that we find in paranoiacs. They usually have some absurd grievance to redress; they regard themselves as the oppressed victims of persecution, and their utterances and conduct are such as to entitle them to belong to the class popularly known as " cranks." If more were confined within the walls of asylums, the better it would be for the community. As a class their acts are incendiary. They are not in sympathy with and do not understand our laws and methods of government. They are subversive of order and dangerous in any community. So long as the differentiation between sanity and insanity is so doubtful in many cases, they should as a class be excluded. The bill does not deal with the question of lunacy, however, but declares in general terms that any person whatever, who shall satisfactorily appear to be an anarchist and whose presence in this country is a menace to the government, or to the peace and well-being of society in general, may be returned to the country of his nativity.

We return, after this digression, to the general immigration bill. With certain exceptions and qualifications, contract labor is barred from entrance, and the old law is made of wider application to include even the semblance of an agreement. Assisted immigrants are also prohibited from landing.

Provision is made to aid in carrying out the law by taxes, fines and penalties. An important feature is the extension of the term of probation to five years after landing, during which time aliens who are found to have landed in violation of the law, or who become a public charge, may be returned to the country whence they came.

The bill provides for the inspection of all arriving aliens by medical officers of the United States Marine-Hospital Service, and civil surgeons may also be employed.

The Commissioner-General of Immigration may from time to time secure information as to the number of aliens detained in the penal, reformatory and charitable institutions of the United States, and shall inform all the officers of such institutions of the provisions of law relating to the deportation of such aliens. Immigration officers may be detailed for foreign service and clothed with power to investigate the antecedents of all immigrants. The bill has been carefully prepared. It is not the sudden outgrowth of a calamitous event, although urged by that event into a greater prominence of thought and of debate. It is a bill which gathers into a comprehensive law all the scattered legislation heretofore enacted upon this subject. It retains only those features which experience has shown to be of practical value, and adds much that those best fitted by observation to judge deem necessary for the protection of the mental, moral and physical development of the American people, and the liberty and prosperity secured to them by a free government.

A Case of Feigned Insanity.—The simulation of insanity implies the existence of a motive for such deception. In the case herewith briefly related the defendant was on trial for murder, so that the strongest motive was supplied. For simulation to be successful, the effort must display features that are consistent with some actual phase of insanity. The simulation of dementia, for instance, would preclude acts of intelligence on the part of one whose mind was supposed to be almost an entire blank. The prisoner was an adult about forty years of age, who had previously been convicted of a felony and had served a term in prison. He had shown ordinary intelligence previous to the date of the murder, with which he was charged. During the

trial, however, and before it, while in the jail, he assumed an apathetic attitude and an indifference to his surroundings and his personal appearance. Upon examination, he was disinclined to talk, his usual reply being: "I don't know," or "I can't tell." In fact, he assumed too great a lack of understanding. For instance, he could not tell whether he was sitting in a room or out of doors; whether he had on boots or shoes; whether he was wearing his own clothes or not. He professed to be unable to tell his age or place of birth. He claimed that he did not know the nature of the court proceedings, or if they concerned him. He would often refuse to answer, and sat with downcast eyes, and was in a dull, apathetic condition. He was docile and was easily led about, or followed his jail keeper. After our extended course of questioning, in his opinion, had apparently ceased, and while he was being subjected to physical tests, and to an examination of his eyes, he was casually told, as a trial of his apparent dullness, to approach nearer the light. While he was moving, he was directed to go to the *third* window from the end of the room and to sit down before it, which he did. The performance of this act and the selection of the window were in such marked contrast to his previous conduct that it was noted as one of a number of acts which, though not conclusive, were yet suggestive as being inconsistent with his assumed dementia. The most direct evidence, however, appeared at the close of one of the sessions of the court. As the prisoner was about to leave the bar, in the confusion attendant upon the general rising of the audience and court-room attendants, he was seen covertly but quickly to attract the attention of his counsel and pass him a slip of paper. As he claimed he could not write, the question arose, by whom was he employed as a messenger in thus bearing notes? The inmates of the jail, who were few in number, were examined, and the prisoner was found to have acted as a carrier between one of them and his attorney, who happened to be counsel for both. This second prisoner was led to confess that the feigner, who had been his close associate, was in the habit of repeating to him daily all the details of the trial, commenting upon the witnesses, and had related in full the incidents of his several examinations. The prisoner was unmoved, however, until after the jury brought in a verdict of guilty, when he threw

off his disguise, stood up, and then answered, correctly and promptly, all questions put to him. The evening after his sentence, in a game of cribbage with one of the jail officers, he won three games out of five. Eighteen months afterward he was seen at Auburn prison, where he was awaiting execution. He had shown no signs of insanity during his confinement, and said that he was then seeking a new trial. He furthermore said that he never had been insane and that he regretted that he ever had attempted to set up such a defense. The case is not a remarkable one, and merely serves as an illustration of the simple yet practical methods which were employed to unmask a shrewd feigner. It is difficult in fraudulent cases always to obtain good grounds for an opinion as to the spurious nature of the insanity which is assumed. In fact, men have been declared feigners, and even confessed themselves to be such, who afterward during confinement have become actually insane. The lapse of time, however, shows that in the case above reported there was no error in the diagnosis, as two years have now passed, and the man since his trial has been and still is in good mental condition.

Notes and Comment

AMERICAN MEDICO-PSYCHOLOGICAL ASSOCIATION.—The Fifty-eighth Annual Meeting of the American Medico-Psychological Association will be held in Montreal, the third Tuesday, Wednesday, Thursday and Friday in June (17th, 18th, 19th and 20th), 1902. The meeting follows that of the American Medical Association at Saratoga, which occurs in the second week in June. The matter of transportation has been placed in the hands of the Committee of the latter Association and it is hoped to obtain special railroad rates for both meetings.

The headquarters of the Association will be the commodious and comfortable Windsor Hotel, delightful in all its appointments and especially well adapted for convention purposes. Special rates have been secured for members and their friends. The Committee, under the chairmanship of Dr. Burgess, has taken up the matter of arrangements for the meeting with much enthusiasm and with the large attendance expected, a profitable meeting from every point of view is assured.

The annual address will be delivered by Dr. Wyatt Johnston, Lecturer on Medical Jurisprudence, McGill University Law Faculty, Assistant Professor of Hygiene, the Medical Faculty, Pathologist to Montreal General Hospital etc., etc. SUBJECT —"The Medico-Legal Appreciation of Trauma in Its Relation to Abnormal Mental Conditions."

Papers have been promised as follows:

Dr. J. H. McBride, Pasadena, Cal., Boarding out for the Chronic Insane.

Jas. M. Buckley, D. D., LL. D., Morristown, N. J., The Possible Influence of Rational Conversation on the Insane.

Dr. A. B. Richardson, Washington, D. C., Women Nurses in Hospitals for the Insane.

Dr. Geo. Villeneuve, Longue Pointe, Que., Conjugal Jealousy as a Cause and Excuse for Crime from a Medico-Legal Standpoint.

Dr. Jas. Russell, Hamilton, Ont., The Psychology of Anarchism.

Dr. William Rush Dunton, Towson, Md., Dementia Praecox.

Dr. E. D. Bondurant, Mobile, Ala., The Early Diagnosis of General Paresis and the Possible Curability of the Disease in its Initial Stages.

Chas. K. Mills, M. D., Philadelphia, Pa., The Psychical Symptoms of Focal Disease of the Brain.

E. C. Runge, M. D., St. Louis, Mo., An Analysis of Two Homicides.

E. C. Dent, M. D., New York, N. Y., Hydriatics as an Adjunct in the Treatment of Insanity.

E. Stanley Abbot, M. D., Boston, Mass., The Criteria of Insanity and the Problems of Psychiatry.

J. Elvin Courtney, M. D., Denver, Colo., How near akin are Insanity, Crime, and Degeneracy?

W. H. Kidder, M. D., Ogdensburg, N. Y., Care of the Insane in Brazil.

Louise G. Robinovitch, M. D., New York, The Study of Psychiatry of to-day; what should it be?

Adolf Meyer, M. D., Ward's Island, N. Y., On a Few Important Terminal Diseases of the Insane.

Edward B. Lane, M. D., Boston, Mass., Litigious Insanity.

Edward Cowles, M. D., Waverley, Mass., The Organic Sensations in Mental Pathology.

Owen Copp, M. D., Boston, Mass., Some Results and Possibilities in Family Care of the Insane in Massachusetts.

W. F. Drewry, M. D., Petersburg, Va., Observations on the Insane Negro.

Chas. K. Mills, M. D., Philadelphia, The Psychical Symptoms of Focal Disease of the Brain.

C. R. Woodson, M. D., St. Joseph, Mo., Night Nurses in State Hospitals for the Insane.

W. H. Hattie, M. D., Halifax, N. S., The Development of Self-Control.

Walter Channing, M. D., and Wallace M. Knowlton, M. D., Brookline, Mass., A Case of Adrenal Tumors of the Left Mid-Frontal and Ascending Frontal Convolutions of the Brain.

Papers of which the titles are not yet announced are promised by:

Dr. A. Vallee, Quebec.
Dr. Jas. V. Anglin, Montreal.
Dr. C. G. Hill, Baltimore, Md.
Dr. B. T. Sanborn, Augusta, Maine.

Also Obituaries of:

Dr. R. M. Bucke, by Dr. Burgess,
Dr. John Curwen, by Dr. Chapin,
Dr. F. C. Winslow,
Dr. J. T. Eskridge,
Dr. A. E. Mink,
Dr. W. B. Stone,
Dr. Geo. L. Kirby.

The Secretary will be much indebted for promises of additional papers and will esteem it a favor if those willing to read papers, will be kind enough to send titles at the earliest practicable date.

FIVE MAINE MURDERS.—In a recent number of the *Boston Medical and Surgical Journal*, Dr. Addison S. Thayer of Portland, has an interesting article with the above title. In this paper it appears that no single instance of homicide can be found where a verdict of "not guilty by reason of insanity" has been rendered in Maine. Notwithstanding this apparent absence of insane homicides, the writer declares that in at least five cases of homicide the plea of insanity had been interposed as a defense, but in vain. All five were found guilty of murder and all were unmistakably insane, two of them so palpably insane before death that nobody had any doubts about the matter and the other three are still in the State prison. The cause of this failure to recognize the actual irresponsibility of insane homicides in Maine, he ascribes to the hard and fast doctrine as to insanity and responsibility laid down by the Supreme Court, last stated by Judge Whitehouse as follows:

"When the insanity of the accused is pleaded in defense, the test of his responsibility for crime, afforded by his capacity to understand the nature and quality of the act he was doing and his mental power to distinguish between right and wrong with respect to that particular act at the time he committed it, is the only proper legal criterion."

To illustrate the inadequacy of this test he gives detailed histories of the five cases referred to, the essential features of which we will briefly summarize.

CASE I. Jason P. Scribner, an alcoholic who had murdered two children and had attempted to murder a third child was manifestly insane and had been pronounced irresponsible. He was found guilty of murder in the first degree, and was sentenced to the State prison. Here he was unmistakably and often violently insane. Upon the recommendation of a Commission, after four years he was transferred to the hospital for the insane at Augusta, where he lived but a few days.

CASE II. Thomas J. Libby, also an alcoholic, who murdered his mistress without any assignable motive after a period of time during which he had behaved strangely, was found guilty of murder in the second degree. After he had served seven years of his sentence he was transferred to an insane hospital and died insane a year thereafter.

CASE III. Alfred Hurd an insane degenerate who murdered his father without assignable cause was pronounced insane and irresponsible by experts and notwithstanding was discovered by the jury to be responsible and guilty of murder in the first degree. He has been in the State prison for five years and is at present hopelessly demented.

CASE IV. Bradford P. Knight with an insane heredity had experienced two previous attacks of insanity, in one of which he had been treated in an asylum and thereafter had periods of depression during which he had impulses to kill his children. He finally murdered his wife's sister, with whom he had illicit sexual relations, because he fancied she had joined a conspiracy to send him back to an asylum. After his arrest he refused food in consequence of delusions of poison and was so violent in his excitement as to require to be transferred to an insane hospital. There he planned to kill the superintendent because of delusions in regard to him. After a residence of seven months, he was placed on trial for murder. At the trial he was pronounced insane and irresponsible by three eminent alienists, who although originally summoned by the prosecution had been unable to reach any other conclusion. He was, however, found guilty of murder in the first degree and pending an appeal for a new

trial he was remanded to jail. His mental condition became so evident that at the end of twelve days he was transferred for safe-keeping to a hospital for the insane. Subsequently he was sent to the State prison where his present insanity is evident to all.

CASE V. George H. Brainerd, also with an insane heredity who had delusions of conspiracy and persecution extending over a number of years leading him to bring legal proceedings against certain persons alleged to be conspiring against him, at least a year before he committed the homicide, shot five men in consequence of his delusions and although pronounced insane and irresponsible by eight experts was found guilty of murder in the first degree. The author proceeds to say:

"The voice of the people, formulating opinions concerning these five cases, is perhaps interesting as a study in human nature although a trifle too vacillating to be accepted as the voice of God. The day following the Scribner homicide it is estimated that more than 1000 people from the little city of Augusta went out over the Brook Road toward Sidney, to visit the scene of the tragedy. Almost everybody's first exclamation after hearing of the homicidal acts of Scribner, Hurd and Brainerd, was substantially this: 'He must have been crazy.' Presently people began to say, 'What an ugly fellow he must have been!' The assassination of President McKinley shortly before the trial of Brainerd, called out the remark, 'I suppose the lawyers and doctors will try to make out that Brainerd is insane.' When the insanity of Brainerd was demonstrated in court, and many people who heard the testimony were convinced, there was not a little unfavorable criticism of county officers, because they had subjected the people to large and unnecessary expense. Perhaps the majority of those who had followed the case evinced surprise at the verdict. Acquiescence, however, was speedy and cheerful. 'After all,' people said, 'the State prison is the best place for a man like him.'

"The sexual immorality in the lives of Brainerd, Knight and Libby did not, as a rule, appear to impress people as evidence of defective inhibition and, to a certain degree, a sign of mental weakness; on the contrary, it aroused prejudice; and it is perhaps not unnatural that many good people should allow their brain cells to receive no further commotion from such reports than may be caused by the shock to their moral sense.

"The unnatural nature of the acts of Scribner and Hurd—the killing of their nearest relatives—also gave an inward curve to the judgment of many people. A crime so hideous and inhuman, they reasoned, can meet no punishment sufficiently severe.

"In a conflict between science and law, the law must ultimately yield. This the Maine courts foresee, and one may be pardoned for reading between the lines of the rescript of Judge Whitehouse the regret of a warm-hearted man, that in spite of the plain teachings of modern observation, the Maine courts cannot yet deviate from the old criterion.

"To the lay mind it seems strange that our courts, accustomed as they are to remind witnesses of a radical difference between fact and opinion, should in this matter assume for themselves the predetermination of fact.

"For example, one would not expect a judge to rule as follows: 'For the purposes of the law this case may be regarded as Asiatic cholera, if the jury so find. It is not a case of typhoid fever. There is no such disease as typhoid fever. Whatever the doctors have said concerning such a medical disease, the law does not recognize its existence.' And yet, this is a not unfair reduction to the absurd, of the present rulings of Maine courts in relation to mental disease. No jurist, perhaps, has pointed this out so clearly as Judge Somerville, formerly of Alabama, now of New York, at one time president of the New York Medico-Legal Society. Judge Somerville's conclusions are the fruit of singularly complete and painstaking research, following upon years of service as asylum trustee and lunacy commissioner.

"In the case of Parsons *vs.* State, in 1886, Judge Somerville said: 'The question of the probable existence of mental disease, and the effect on the mind and conduct of the patient, is a question of fact to be proved by evidence. It is equally obvious that courts cannot upon any sound principle undertake to say what are the invariable or infallible tests of such disease. In the present state of the law, we are confronted with this practical difficulty, that the courts in effect charge the juries as matters of law that no such mental disease exists—that there can be, as a matter of scientific fact, no cerebral defect, congenital or acquired, which destroys the patient's power of self-control, his

liberty of will and action—provided only he retains a mental consciousness of right and wrong."

A study of present conditions in Maine appears to justify the following conclusions:

That insanity has never been a cloak for homicide.

That within the last 25 years there have been at least five cases of homicide, and probably others, in which the doer of the act has been insane before and after he did it, and in which there is at least a high degree of probability that the act itself was the product of his insanity.

That these men have all been convicted of murder.

That the convictions are to be attributed in part to the explicit, lucid, archaic and rigorous rulings of the Maine courts.

That the practical working in Maine of the "only proper legal criterion" is to concede irresponsibility only to idiots and to maniacs.

That a realization of these facts on the part of the courts, the prosecuting officers and the public, together with increasingly accurate knowledge of the nature of mental disease, must inevitably lead to verdicts which are at the same time more just, more scientific and more humane.

An Opening for Internes in the State Hospitals.—Students about to graduate who are unable to secure positions in general hospitals, or young physicians whose terms are about to expire in general hospitals and who wish to enlarge their experience, are now offered an opportunity to enter the New York State Hospitals as Internes or Clinical Assistants.

These positions provide lodging and board. Appointments are made for a year. Some twenty-eight positions will be opened in the fourteen State Hospitals situated in the following places in New York State:

Utica,	Ward's Island, N. Y. City (two hospitals),
Buffalo,	
Gowanda (homeopathic),	Rochester,
Binghamton,	Ogdensburg,
Kings Park, L. I.,	Poughkeepsie,
Flatbush, Brooklyn,	Willard,
Central Islip, L. I.,	Middletown (homeopathic).

Although these are hospitals for the insane, yet they are so large that opportunities for experience in general medicine are abundant. Each hospital is well equipped with clinico-pathological laboratory and apparatus, operating rooms, trained nurses, hydrotherapeutic and electrical devices and good medical libraries. The field for study in general medicine is excellent, and surgical operations of all kinds are frequently performed, either by resident or consulting surgeons. It is thought that many students who wish hospital experience and are unable to obtain it because of the relatively few places available in general hospitals may be glad to learn that positions of this kind have been thrown open to them. It is believed that young physicians wishing hospital experience will profit by a year's residence in one of these hospitals, and such as desire to continue in special work would be eligible for appointments subsequently to salaried positions in the same service.

No examinations will be necessary, but application must be made in person with good references, directly to the medical superintendent of any of the above named hospitals or to Dr. Frederick Peterson, President of the Commission in Lunacy, 4 West 50th St., New York City.

DR. RICHARD M. BUCKE.—In "*Leaves of Grass*" we read:

> "Think of the soul;
> I swear to you that body of yours gives proportions to your soul somehow to live in other spheres;
> I do not know how, but I know it is so."

What verse could more vividly conjure up the picture of our dear old friend? Word came that he has gone from us, but has he? To us who had the great good fortune of coming under the spell of his presence only a few short months since, he has not gone: we see him at this very minute,—we see the massive frame overtopped by the finely moulded head, the lofty brow, clear-cut nose, sensitive mouth, the flowing beard. Our hand retains the memory of the honest grasp of his generous hand,—our ear recalls the sonorous modulations of his voice,—our eye still holds the impress of his gaze kindled by the calmly burning light of rare mentality and unmeasured kindliness. We listen to the words of wisdom from his lips,—much of this wisdom of his own

and not of ours, still inwrapping us by its rugged honesty and magnificence of concept. The memory of it all is of such plastic reality as to proclaim in convincing notes that the clod is gone but not the man,—a man such as he, will live with us as long as breath is left within us. He was one of the elect who are loved as soon as met. Stripped of all adventitious traits entering into the make-up of man of the latter days, of his training, work and daily labors, before us stands the man in his naked, majestic naturalness. Like the breath from pristine mother earth, like wafts from the depths of unpolluted nature, his very presence exhaled health and vigor. Such influences do not die with the ceasing contact, clod to clod; once felt, they can never be effaced. May we not hope with our friend that "Only a little while now and we shall be again together and with us those other noble and well-beloved souls gone before", prophetic words dedicated but a few years since to his departed son Maurice Andrews? Let us call to him, his and Whitman's words of parting: So long! So long!

E. C. R.

Organization of Institute for Psychiatric Study in New York.—In the annual address delivered before the Neurological Society of Philadelphia, Dr. Meyer outlined what he would consider safe ground for psychiatric research, and especially what conditions demand consideration in any such plan as the organization of a central institute of psychiatric study in the State Hospital system of the State of New York. In the face of several high-sounding and would-be constructive sketches which have given the public a somewhat too imaginative view of the duties and possibilities of psychiatry, and fully aware of the nihilism of a large number of medical men concerning the prospects of study in this complicated field, he chose to give a simple statement of the existing conditions and opportunities, of efforts for advance which have been made, and of the reasons for a certain degree of lack of satisfaction with the outcome of some of them. On these premises he built a brief sketch of the general policy which would seem most promising and least exposed to calamities from weakness of the roots or from premature starts before the season of frosts had passed by.

Medical schools have medical and surgical clinics specially organized for the purposes of teaching and research; but they are

only guests in hospitals for the insane, and offer no chances for the study of the fundamental requisite of special work in psychiatry. In the hospitals the economic problems are so enormous that the heads and even the assistants are not in an advantageous position to make up for what the medical schools are forced to neglect. The opportunities for better work exist and are utilized in many places, but often under discouraging conditions. There are frequent changes in the entire policy of the hospitals, too often dominated by ideals of economy rather than of efficiency, on the part of the State. Owing to the small number of physicians, an unfavorable ratio between the administrative and the truly medical issues on the work tends to crowd out the student, and these draw-backs are accentuated by some fundamental defects in the efforts to correct the appearance of lack of scientific interest. The point of attack for efficient changes lies in these last-named elementary matters, and an increase in the numbers of the staff and in their chances for learning, as well as more enlightened policy of the hospitals and the State can be expected only from a natural evolution from the foundation.

Scientific medicine or pathology has been introduced in many hospitals for the insane, but usually general hospitals have been copied and the advance has taken the shape of a microscopist, our hopes, it would seem, being chiefly centered in laboratories and in methods used in modern clinical medicine and modern psychology.

In principle, this is certainly correct and legitimate. But as conditions now are, many of the new methods find no adequate home in the present status of our clinical knowledge of psychiatry. As a consequence, much of the work appears disconnected, lacking the aims which so plainly exist in the pathological study of many of the somatic diseases, so that we are forced to recognize that to apply detailed methods before the foundations are laid is an attempt at making a short cut and one sure to fail sooner or later.

The advance of general pathology in the other fields of medicine was built on a strong foundation laid by the great clinicians of the beginning of the last century. Psychiatry, especially in this country, has had to cope with large practical problems and the foundations of a careful knowledge of the facts about insanity

were meagerly treated. We lack, to-day, sets of records systematically taken which would furnish us such material for the finer methods of psychiatry as bacteriology and other branches of pathology found in the clinical knowledge of consumption and of diphtheria, and such as are available for the open problems in our knowledge of measles, scarlet fever, smallpox, etc.

The temporary lack of directness of records must not deter us from efforts to improve them and from working for that which other branches of medicine could do a hundred years ago. It is a grave error to think that statistics of large numbers can help us over the lack of real certainty of what is seen and has been done in individual cases, so long as the uncertainty and haziness is no mere accident but the rule. Out of the needs of explanation in individual cases and in groups of cases, problems of detail will arise and only with a contact with a well-worked up clinical material can we hope to gain the necessary appreciation of proportions and relations in plans of work and the valuation of the importance of results.

Neither anatomy nor pathological anatomy of insanity, nor old and new psychology by themselves, nor a collaboration of all the biological sciences, can make up for the lack of a safe foundation, and the sooner we recognize that not anatomy as such, but every mode of establishing chains of facts which allow of experimental control or approach experimental certainty, is veritable pathology, the sooner we shall get rid of that uneasiness which undoubtedly exists in many places and leads to the nihilistic assertion that "there is no pathology of insanity as yet."

The normal development of psychiatry, therefore, demands not an extraordinary revolution, but before all a well-planned organization and improvement of that which exists as practical work. A recognition of its opportunities and needs, united with a knowledge of the methods available in scientific medicine and the special sciences of biology, are alone able to bring about that helpful co-operation which the hospitals have a right, and which it is their bounden duty, to look for.

Dr. Meyer gave a sketch of the organization carried out in the Worcester Insane Hospital, and described in its annual reports. He then went on to outline briefly the plan of a central institute which, in order to be helpful to the State hospitals, must do work

in harmony with that done in them; which must get its foundations on clinical work conscientiously carried out, and develop an interest in the possibilities of improvement among the medical staffs of the State hospitals.

The needs of the assistant physicians lie in directions in which little help can be obtained from medical schools or books; and it is not only commendable but an absolute duty on the part of the State to provide chances for training and research, because it and a few wealthy private concerns monopolize the institutions in which psychiatry can be studied at all, and in which thorough knowledge of the methods and problems can be acquired and taught. The State forces its physicians on the patients, who are deprived of their choice by law and disease, and the State must therefore see to it that its institutions are capable of carrying the burden of this serious responsibility.

It is to be regretted that so many programs of psychiatric research consider it below their dignity to insist on the correction of some of the simple defects in the work, and dwell on Utopias for which as yet foundations are absolutely unprepared. Of these Utopias little was said in the address, nor were any promises made which cannot be safely expected to be capable of fulfilment under satisfactory conditions.

The new institute will provisionally be located on Ward's Island. A small clinical service will be arranged and conducted with special reference to teaching and research so that assistant physicians from various hospitals can get training in all the matters which they meet in their own work. Practical demonstrations are furnished dealing with the issues concerned in examinations, methods of obtaining and recording general clinical, chemical, and psychological data, and the requirements for appropriate utilization of the autopsies. Satisfactory and helpful teaching can only be given on material collected by the teacher and accessible to the one who is taught; and an institute furnishing this will form a natural basis for special research, as well as meet the demands of the hospitals, so that a more natural relation and harmonious co-operation in the work between their physicians and the institute can be effected. It is to be hoped that these definite and unassuming plans will inspire the necessary confidence of the governing bodies until the work itself can demonstrate its justification.

RETIREMENT OF DR. G. H. HILL.—Dr. Gershom H. Hill, Medical Superintendent Iowa State Hospital for the Insane at Independence, Iowa after 28 years' service at this Hospital has sent to the Board of Control of the State Institutions his resignation to take effect July 1, 1902. Dr. Hill proposes to enter into private practice at Des Moines, Iowa confining himself to neurology and psychiatry. Dr. Hill has been one of the most earnest and active workers in the American Medico-Psychological Association and has, in his work among the insane in Iowa, done much to elevate the standard of care and the excellence of the work done in the institutions of that State. He has been at all times an ardent advocate of scientific work in the wards of the hospitals and in the laboratories and although one of the older superintendents has been as energetic and enthusiastic in this direction as have been many of the younger men in the Association. It is gratifying to learn that Dr. Hill, in severing his relations with institutional work, will still continue his relations with the Association.

RETIREMENT OF DR. YELLOWLEES.—The retirement of Dr. David Yellowlees in consequence of ill-health and failing eyesight from the superintendency of the Royal Glasgow Asylum at Gartnarel is announced. The services of Dr. Yellowlees to psychiatry began at Morningside in 1858 as an assistant physician. In 1863 he was made superintendent of the Glamorgan County Asylum and afterwards transferred to a similar position at Gartnarel in 1874. At the Glasgow Royal Asylum during the past twenty-seven years he has had a most successful career. The many friends of Dr. Yellowlees in America unite in expressing the hope that his leisure will be employed in literary work. He retires with the universal love and confidence of alienists in England and America.

Obituary

RICHARD MAURICE BUCKE.

On the 19th February, 1902, Richard Maurice Bucke, M. D., one of the most striking personalities in the American Medico-Psychological Association, died under particularly sad circumstances. About eleven on the evening of the 18th, he went out on the veranda of his residence, as was his custom, for a short walk, before retiring. He was apparently in the best of health and no one had the slightest premonition of the impending calamity. His family heard him fall, and going to his assistance at once, found him unconscious. He never rallied, and in a few hours died.

Richard Maurice Bucke was born on March 18th, 1837, at Methwald, Suffolk, England. In 1838 his family emigrated to Canada, and settled on a farm in London Township, Co. Middlesex. Here the lad remained until he was sixteen, when he began to long to see the world. Even at this age the problems that occupied his mind to such a great extent had begun to attract his attention, "The Vestiges of Creation" giving, as he himself said, "a meaning to the little I knew about the world. Later when I read the incomparably greater works of Darwin, he only seemed to enlarge and deepen an impression already made, rather than to teach me anything new, or to sway men in a direction different from that already entered upon."

His first experience of life was in the United States, and in his anxiety to see the world, he accepted any chance that came, working on farms and on steamboats, even acting as deck hand, so long as he gained his desire. He drifted south, via the Mississippi. In the spring of 1856 he went west with a cattle train, acting in the capacity of cook to the party. The destination was Salt Lake City, but of course this was merely a starting point for the adventurous spirits bound for the Pacific Coast. At

Salt Lake City he joined a small company setting out for California, a hazardous undertaking at that time, particularly as the party had determined to walk the whole distance, although their supplies were carried in wagons. The inevitable happened, and in a desperate fight with Indians three of the little band were killed, the wagons and supplies captured, and the survivors forced to attempt the remaining three hundred miles without resources of any kind. A pitiful story it was, and of the fifteen who set out, only four reached their destination, and these were almost starved, when the journey was over. So great was their need of food at times that they were forced to feed on seeds and small frogs to keep body and soul together. When poor Bucke reached the Humboldt he was almost dead from thirst.

He next appeared in California, and during the winter of '59-'60 was again the victim of tragic circumstances, being the sole survivor of a mining party. He was very badly frozen while in the mountains, and if it had not been for his wonderful vitality and indomitable will power, would never have reached a settlement, or pulled through the long and terrible illness that followed his exposure. The injuries received on this memorable trip across the mountains made walking somewhat difficult for him, so he returned to Canada via the Isthmus of Panama in 1860, and commenced the study of medicine, graduating with high honors in McGill University, Montreal, in the spring of 1864. His thesis won the first prize. After graduation he sailed for Europe, spent eighteen or twenty months in the London and Paris Hospitals, and on his return went to California for eight months, as a witness in the Gould and Currie Silver Mine Suit.

He settled in Sarnia, Ont., where he practiced for ten years, when he was appointed Medical Superintendent of the Hamilton Asylum for the Insane, and after a year's service there was given the Superintendency of London Asylum, an office he retained until his death, just twenty-five years after his appointment.

On his return from California he was married to Miss Jessie M. Gurd, who survives him.

Dr. Bucke received many honors from his medical friends, was President of the Medico-Psychological Association in 1898 and was regarded as one of the foremost men in medical circles in Canada.

Dr. Bucke was a man of striking personality, as suggested at the commencement of this notice, and it is impossible to judge him by ordinary standards, so great a part did individuality play in his make-up. There were so many sides to his character that we must be content to refer to him chiefly as an alienist, and leave others to speak at greater length regarding his claims to recognition in literary and philosophical circles. What ever this remarkable man did, he did with his whole soul and no one ever dreamed of attacking his sincerity of purpose, no matter how violently they differed from his conclusions. Some are inclined to think he was a faddist, but this word scarcely expresses the truth. Enthusiast, Dr. Bucke certainly was, but not a faddist in the sense that he rode a hobby for a time, and then dropped it. He pursued certain ideas with a pertinacity only possible to a person of his mental vigor, and he never failed to make out a very strong case for what he contended, whether it was the undoubted right of Walt Whitman to occupy the very highest niche in the Temple of Fame, or the existence of such a sense as Cosmic Consciousness.

As an alienist he was eminent, and his name will be associated with such reformers as Joseph Workman, when the history of the insane in Canada is written. He it was who in Canada first accepted non-restraint as something better than a fad, and in his institution the non-restraint system was first adopted (1882), although this lead was promptly followed by Kingston and Toronto. It marked the beginning of an era of better things for the insane of Ontario, and Dr. Bucke's energy was a stimulus to many of the juniors in the service. His views on the abuse of alcohol in the treatment of insanity, and his reports of extensive investigations in gynaecological surgery among the insane, are too well known to discuss at length, but after all, Dr. Bucke's views regarding the latter were never quite as extreme as sometimes represented. Carefully analyzed, his views, after he had followed this line of investigation for several years, were, that a large proportion of insane women suffered from uterine and ovarian diseases, which could be benefited by operation. The improved physical health resulting implied a better state mentally. That this was good common sense all agree, the point at issue being the ability, or want of ability, of the majority of

specialists to decide which are the cases to be operated on. After all, in these days of marvels in surgery one hesitates long in deciding which are the chronic cases to be denied the surgical chance. Regarding the acute cases there is probably a more debatable ground than the doctor would admit.

Dr. Bucke was an ideal Superintendent, loved both by his patients and employees, and had a deep sympathy for the old and infirm, a sympathy becoming rarer and rarer in these days of hurry and rush, and his warm heart won him lifelong friends wherever he went. His library was one of the most extensive in Canada, and the doctor was an untiring student, reading widely and deeply, particularly along the lines suggested by his remarkable books on Man's Moral Nature and Cosmic Consciousness. How these books must rank as probable solutions of questions which have worried the greatest minds since the world began, time alone can tell. It is too soon to sit in formal judgment on them.

Dr. Bucke's friendship for Walt Whitman, his doughty championship of the Good Grey Poet's right to recognition as one of the remarkable men of the nineteenth century, was an admirable thing, and the fact that some of the best minds of the day agree with this estimate of Whitman, is significant. When Dr. Bucke was elected President of the Medico-Psychological Association in 1898, all Canadians felt the compliment, and were pleased that the honor had been conferred on one so worthy and so well able to assume the duties of the position.

In person Dr. Bucke was of striking appearance, of splendid physique, and carrying the stamp of intellectual force in his face. He dressed much after the style of Whitman, and would be remarked in any assemblage as a man of originality. In daily life he was simple, direct and honest, and loved nature as such a man is likely to do. The happiest days of each year were those spent at his summer retreat at Gloucester Pool in Muskoka. This good man is deeply mourned by a large circle of friends, who loved him for his sturdy honesty, his warm heart, his intellectual force, but most of all for his noble qualities as a man.

C. K. C.

DR. GEORGE A. SHURTLEFF.

Dr. George A. Shurtleff, for 18 years superintendent of the State Insane Asylum of California, at Stockton, California, died in that city February 11, 1902, aged 82 years. He was a graduate of Vermont Medical College at Woodstock, Vt., in 1845, and was formerly professor of mental diseases and medical jurisprudence in the medical department of the University of California. His work at Stockton was a pioneer work and he finally failed in health under the severe mental and physical strain incident to his position and was compelled to retire from active service nearly twenty years ago. He was a man of great force of character and singleness of purpose which qualities enabled him to overcome many difficulties in providing for the insane in California.

DR. JOHN T. ESKRIDGE.

Dr. John T. Eskridge died at Denver, January 16, 1902 of cerebral hemorrhage consequent upon Bright's disease. He was born in Delaware, in 1847 and graduated at Jefferson Medical College in 1875. He received the appointment of instructor in nervous diseases at Jefferson and continued to reside in Philadelphia until 1884 when owing to the failure of his health he removed to Colorado Springs. After a residence of two years at Colorado Springs he removed to Denver where he continued to reside until his death. He was a voluminous writer and was the author of many monographs upon neurological and allied medical subjects. He was a member of the American Medical Association, of the American Medico-Psychological Association and of the American Neurological Association. He had been president of the board of trustees of the State Insane Asylum at Pueblo. He was neurologist to several hospitals in Denver and at one time was at the head of the department of nervous and mental diseases at the University of Denver and at the University of Colorado. He delivered the annual address before the Medico-Psychological Association at the St. Louis meeting. He was a man of untiring industry and large ability and his death is a serious loss to the profession in America.

DR. BARTON W. STONE.

Dr. Barton W. Stone, of Louisville, Ky., died at his residence in that city November 13, 1901, after a comparatively short illness. He was born in Missouri in 1844, and received his early education at Fulton, Mo., and afterwards studied medicine at the Kentucky School of Medicine where he graduated in 1867. In 1869 he received an appointment as assistant physician at the Western Asylum at Hopkinsville, Ky., and filled the duties of that position for twenty years. In 1889 upon the retirement of Dr. Rodman, he was made superintendent and served for seven years. In 1896 he resigned and after a tour in Europe, he removed to Nashville, Tenn., to assume the oversight of the Morningside Sanitarium upon the death of Dr. J. H. Callender. In 1899, he relinquished this enterprise and established Beechhurst Sanitarium at Louisville, Ky., and conducted it successfully until his death. He was respected and beloved by all who knew him. He was unmarried.

Abstracts and Extracts

EYE DEFECTS IN CHILDREN. C. S. Bull in Pediatrics (February 15th, 1902) in an article entitled "The Eye Defects Which May Cause Apparent Mental Dullness and Deficiency in Children" says that anomalies of refraction are most frequently met with. Hypermetropia is the most frequent form and the symptoms of pain in the eyes, headache, and a sense of pressure and weight upon the eyes and brain after continuous close work, are so constant and at times so severe that the child becomes dull, slow and even stupid. When the refractive error is properly corrected the dullness rapidly disappears as well as the subjective symptoms.

Astigmatism is the next most frequent refractive error found, and myopia is the most important error, because of its possible disastrous results. "The mental evolution of a child suffering from unrecognised myopia is instructive. Unable to see what his companions see, jeered at by his fellows for his failures, he retires within himself and lapses into desultory or miscellaneous reading by himself. He becomes introspective and perhaps perverted in his tastes, and selfconsciousness becomes one of his mental attributes." The author then briefly refers to muscular anomalies, the rarer ocular defects such as congenital cataract, and concludes with some observations on congenital word blindness. Changes have been found in the left supramarginal convolution and angular gyrus, which seem to indicate that they form the centre for visual memories of letters and words. In severe cases Dr. Bull thinks the attempt to teach the child to read should be abandoned and he should be educated on other lines.

CERTAIN MENTAL CHANGES THAT ACCOMPANY VISCERAL DISEASE. (Abstracted from *Brain*, Autumn, 1901, by G. Y. Rusk, Clinical Assistant, Sheppard & Enoch Pratt Hospital.)

Under the above title Dr. Henry Head, in the Goulstonian Lectures for 1901, presents the results of pioneer work, and opens up for investigation a field absolutely new in psychopathic research. The problem which he undertakes is best stated in the following paragraph which I quote from the introduction to his article. "Now that disease of internal organs has been shown to be accompanied by pain radiating about the surface of the body and by tenderness of its superficial coverings, it becomes necessary to examine in how far the intrusion of such stimuli upon the nervous system is accompanied by changes in consciousness." But before entering upon the treatment of his main theme, he first, in the remainder of his introduction, tells of the variety of cases examined—the patients belonged to the ordinary hospital class, as seen in the Victoria

Park Hospital for Diseases of the Chest, and at the London Hospital—and also speaks of the methods and precautions taken to gain the complete confidence of the patients and of the tactfulness necessary to insure full and reliable records. Moreover, he carefully excludes from his records all patients having any hereditary taint of insanity or any nervous disease and all Hebrews on account of their tendency to functional neuroses.

The first chapter deals with the changes that may accompany visceral disease. In the first section the author considers *hallucinations*. He finds that "under certain conditions sane persons suffering from visceral disease are liable to develop hallucinations of sight, hearing or smell." The sense of taste was not investigated. As to the character of hallucinations of vision, Head finds that the vision appears only in the absence of actual visual stimuli; that it assumes the form of a figure, misty in outline and draped or wrapped in a sheet or shawl, while at times it consists of a face only. From this the transition to a pair of eyes looking through the bars of the bed—of which more than one patient complained—is easy. The color of the image is always simply white, gray, or black, never even normally tinted. Sex is usually indistinct. The figure or face is single, usually stationary or glides along. It persists for a variable length of time and then disappears. Hallucinations at first are always accompanied by the physical signs of fear—as sweating, goose-skin, palpitation of the heart or the like; but the patients soon become tolerant and do not mind the figure. The feeling-tone which accompanies hallucinations of vision varies, but it is always depressed when the figure is dark in color. The mood is frequently depressed.

The hallucinations of hearing are characterized more especially by the fact that they occur in the absence of external noise; their intensity varies markedly, they are never heard as articulate words, but noises of more or less simple musical sounds. The accompanying feeling-tone varies widely, but is unpleasant. Fear and its physical manifestations almost always appear. The hallucinations of hearing have a peculiar insistent quality. The hallucinations of smell are characterized by the fact that they are always unpleasant; they are driven away by strong actual odors; they occur in the daytime and principally in connection with food; they may be projected upon or intensified by the sight or thought of food. Nausea is not an infrequent accompaniment and vomiting may also occur; sweating is sometimes present, but is to be considered rather as an associated phenomenon of nausea than as having any relation with fear. The feeling-tone is always unpleasant.

Having considered hallucinations the author next turns to the consideration of moods and first to the "sense of ill-being." By this term he means a depression which is without reason, which occurs paroxysmally, which causes the patient to be seclusive, which attempts at diversion, especially in the form of music, increase rather than diminish. The patient shows a great tendency to weep; he is unable to explain his conduct and has an idea of impending ill. His visualization is in dark and gloomy colors, one patient explaining that when he thought of his home it looked

like "we had been sold up." The idea of suicide is usually spurned, but in two cases in which it was meditated the motor impulse was lacking.

The duration of a mood is as short as half an hour, but may be much longer; or the condition may recur many times a day. In contrast with the depressed mood there also occurs a state of exaltation or feeling of physical strength; like the former, however, this mood is transitory and any attempt on the part of the patient to exert himself convinces him of his mistake.

Suspicion.—This third change in consciousness is the logical outcome of the oft repeated sense of ill-being. It is an impulse built upon an emotional state rather than a delusion. The patient believes that people are against him or in some way consider him inefficient in his work, &c. Or he may imagine that a group of people are talking against him, but he never overhears the conversation and never thinks that they are accusing him of any sin or immorality. A simple denial will satisfy him of the falsity of his charges of insincerity.

Chapter II deals with the causes which underlie the phenomena summarized above. It opens with the presentation of five tables which are of the greatest interest. In this way the author presents in a condensed form the cases which he has investigated of various forms of cardiac disease, including aneurism and dilatation of the aorta, adherent pericardium and also pulmonary diseases—tuberculosis, tuberculosis with gastro-intestinal complications, fibrosis of the lungs and asthma. He shows that the one necessary and sufficient cause for these mental changes is visceral reflected pain. "This type of pain is produced by impulses passing from the affected organ up the fibres of the sympathetic, through the ganglion of the posterior root into the central nervous system. A disturbance is thereby set up in those segments that stand in relation to the affected organ. Other sensory impressions entering the same segment are modified, and pain is produced radiating around the body, accompanied by increased sensibility to pain of the superficial structures of the body within the supply of the affected segments." Besides this essential cause there are a number of predisposing factors which influence the occurrence of mental changes. As regards *sex*, mental changes are somewhat more than three times as numerous in women than in men. Menstruation itself is a cause of visceral reflected pain and causes to extend any pain of other origin that may be present. It also lowers the resistance of the nervous system generally. Fever, anæmia and rapid loss of weight likewise favor the appearance of mental changes.

Causes that underlie the depressed mood.—The author thinks that a term is needed in English psychological literature to denote "a state of mind in which consciousness is dominated by a feeling-tone, but where the resulting state is not projected" thus differing from an emotion. For this he suggests the use of the term "mood," which bears this significance throughout his article. To produce the depressed mood, then, we must have the visceral reflected pain acting with considerable intensity and duration, covering a number of segmental areas. Depression is more

likely to occur if the abdominal segments are involved rather than from complication of those governing the thoracic region. Headache alone of the reflected type may be accompanied by this condition, but not so readily as similar abdominal pain.

Causes that underlie the feeling of physical exaltation. This condition is not so frequent as the preceding one. It also is a tone-feeling entirely, and is unaccompanied by any real increase of physical strength. "There is reason to believe that the more definitely a sensation is projected, the less is likely to be the feeling-tone by which it is accompanied." So the ill-defined sensations which arise in the viscera become conscious entities as little more than a feeling of well- or ill-being. When visceral pain and consequent depression are relieved the swing is so marked as frequently to amount to a feeling-tone of exaggerated well-being. This condition should not be confounded with the common "spes phthisica" which is simply due to the ignorance on the part of the patient of the gravity of his condition. Again, the excitement of cardio-vascular origin should not be mistaken for a feeling of physical exaltation.

The causes that underlie the state of suspicion.—This condition is the direct outcome of the depressed state, and among its most marked features is the sense of impending ill and of unworthiness. With this background it is but a step to the idea that those about him are inconsiderate or think ill of him.

Conditions associated with the appearance of hallucinations.—It has been shown above that the depressed mood, the exalted state and suspicion are closely related to reflected pain of visceral origin and to each other. In this particular hallucinations stand apart. Their occurrence is much less frequent and always follows one or more attacks of depression, though in hallucinations of sight, as they occur in herpes zoster ophthalmicus, it is little marked. The additional factor necessary is apparently scalp tenderness of the reflected type—(Here the author refers to his former publication—Brain, 1894, p. 436.) In this connection it is of interest to recall Gaskell's suggestion—that the sensory fifth nerve represents the somatic branch of the vagus, so that impulses entering from the viscera by way of the vagus can cause pain over certain areas of the scalp. Here too the representation is a segmental one and not a representation by organs.

To summarize briefly, then, the appearance of hallucinations is determined by localized scalp tenderness of a reflected type. If the same type of pain occurs elsewhere on the body the hallucinations are so much more likely to occur, or if the other predisposing factors cited above be present; there is also some evidence to show that probably the variety of the hallucinations is determined by the area of the scalp showing tenderness.

The third chapter treats of changes in attention and memory. There seems to be no connection between loss of memory and attention on the one hand and visceral referred pain on the other. Memory for the remote past is unimpaired, while the power of new acquirements seems limited. This is due, no doubt, to the loss of power of fixation, rather than to any real failure of memory. Any special faculty based on mem-

ory that may exist is apt to suffer first. While any direct relationship between visceral reflected pain and changes in attention cannot be made out, it is not unlikely that with the feeling-tone occupying the center of consciousness, the possibility of receiving external impressions and conducting intellectual processes is limited. Orientation in these cases is uniformly good.

The fourth is the concluding chapter. In it the author sets forth certain more or less hypothetical, though interesting, explanations for the relation of reflected pain and mental states, as well as the causes which lead to this condition of things. Under normal circumstances visceral life goes on outside of consciousness, but when the central field of consciousness is occupied by visceral impulses the character of the individual is changed, for the content of his consciousness is altered, and he becomes the victim of every feeling-tone which he cannot control but the unreasonableness of which, in the light of past experience, he fully realizes. As to the causes which lead to this state of things the author recalls the fact that that portion of the nervous system which is related to vegetative life is the oldest and still presents most completely the segmental characteristics. A wounded animal to avoid being killed by its companions will hide away and it is this same impulse, salutary to the animal and related to visceral function, when occurring in the central field of consciousness in man, that causes the depression and wish to avoid any intercourse with his fellows.

The article is supplemented by an appendix giving the full histories of the reported cases.

Book Reviews

The Mental Functions of the Brain. By BERNARD HOLLANDER. (G. P. Putnam Sons, New York & London, 1901.)

Under the title "The Revival of Phrenology," Hollander has published a volume containing many promises for relief from our ignorance in psychiatry and in the knowledge of the function of the brain and a very large number of abstracts of cases taken rather indiscriminately from casuistic literature.

The appreciation of eccentric genius is apt to swing like a pendulum. Gall, in many respects a brilliant and indefatigable worker, has received a number of "Ehrenrettungen" of late years. Moebius has pointed to an interesting finding in harmony with Gall's theory, the occurrence of a special formation of the orbit in mathematicians. Bunge in his physiology does justice to many good observations of Gall who had been relegated to the ranks of untrustworthy dreamers and even impostors owing to the great influence of the now refuted views of Flourens.

Hollander goes further than any previous champion of Gall. He follows the step of his master with a large material and after a general chapter on the brain as the organ of emotion as well as that of intellect and on the lack of progress in the study and treatment of the insane, deals with the pathology of melancholia (page 57-110), of irascible insanity and mania furiosa (page 111-176), mania of suspicion and persecution (177-197), kleptomania and the brain centers for hunger and thirst (198-220), the localization of special memories for words, music, numbers, and colors, etc., (221-272), materials for further localization (273-300), the cerebellum (301-332), the relation between brain and skull, the significance of cranial contours, the brain and skull of a typical criminal, the doctrine of free-will (333-362), the history of Gall's doctrine and phrenology, the opposition to phrenology and Auguste Comte's positive psychology, based on Gall's doctrine (363-492).

Looking over the tremendous material, one cannot deny that there must be opportunities for more knowledge than we can claim today. Looking, however, at the way it is collected in this book, one must also admit the great difficulty in collecting material which is reported without any reference to the purposes for which it is finally used by the collector.

On the one hand, the writer's classification of mental disorders is exceedingly loose. In the chapter on the pathology of melancholia, he accumulates, as he claims, the clinical records of one hundred and fifty cases, including fifty cases of injury, half of which recovered after operation. In some of these cases there are lesions which, according to the

best settled experience, would make us expect definite disorders of an aphasic character, especially disorders of reading and writing, inasmuch as Hollander believes that lesion of the angular gyrus is at the bottom of mental depression. Under this he includes, it appears, any form of depression from the almost physiological reaction to the feeling of illness to various forms of stupor. On the other hand, he carefully avoids the numerous cases of undoubted lesion of the parietal lobe where such depression has not been noted, and the even more numerous cases where the same kind of depression has been found without any evidence whatever of lesion of the parietal lobe, and the fate of Madret's "Démence mélancholique," which the author does not mention.

One must admire the assiduity of the writer in his effort to get together all possible cases from so many sources, but certainly deplore the indiscriminate reliance on very slight evidence in records and the dependence on numbers rather than on accuracy of evidence in the cases adduced.

The degree of profit one can derive from this surprising aggregation of records will largely depend on the sensitiveness of the reader and with all effort on my part to read the book without prejudice, I must admit that the writer's method has probably taxed my patience more than was compatible with a patient sifting of all the details adduced as facts.

To many the book will remain a curiosity; to some perhaps a stimulation and to the others a source of poorly-founded but perhaps nevertheless attractive and enticing speculations.

The principles laid down by Charcot and Pitres in their little monograph on the localizations of the cortical motor centers, should decidedly be observed fully as conscientiously in such a difficult field as that of localization of conditions which are very complicated and far from being known as clearly as simple motility.

Recherches cliniques et thérapeutique sur l'Épilepsie, l'Hystérie et l'Idiotie. Compte-rendu du service des enfants idiots épileptiques et arriérés de Bicêtre pendant l'année, 1900, par Bourneville, etc. (Paris, Progrès Médical, 1901.)

This voluminous report of the service at Bicêtre contains a great deal of interesting matter. The first part is largely statistical but is by no means dull reading. The second part is much longer, occupying over two-thirds of the book, and is devoted to symptoms, therapeutics and pathological anatomy. There are nineteen special articles, nine being by Bourneville alone, and six by Bourneville in collaboration with others. A report of two cases of idiocy in brothers, one showing atrophy of the cerebellum, is perhaps the most interesting paper, but another on symptomatic idiocy of pachymeningitis and chronic meningo-encephalitis does not fall far behind. The histologic examinations of the cases studied has been exceptionally well done by Phillipe and Oberthur. The illustrations are very good and the make-up of the report is neat and pleasing.

The American Year-Book of Medicine and Surgery for 1902. A yearly Digest of Scientific Progress and Authoritative Opinion in all branches of Medicine and Surgery, drawn from journals, monographs, and textbooks of the leading American and foreign authors and investigators. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of GEORGE M. GOULD, A. M., M. D. In two volumes—Volume I, including *General Medicine*, Octavo, 700 pages, illustrated. (Philadelphia and London: W. B. Saunders & Co., 1902.) Cloth $3.00 net.

The American Year-Book for 1902, presents in a condensed and easily accessible form the latest literature of medicine. The collaborators in every department have culled widely from all available sources of medical knowledge. Thus in typhoid fever we find the latest work of the best authors and references to the newest literature; in yellow fever a résumé of the epoch-making labors in Cuba of Reed and his associates; in tuberculosis the inconclusive views of Koch upon bovine and human tuberculosis presented at the London Congress of Tuberculosis and a careful summary of the opposing views of Nocard, McFadyean and Ravenel which have gone so far to disprove his position; in the discussion of cancer a summary of the incomplete work of Gaylord and in all other departments equally comprehensive and painstaking summaries. To those who wish to inform themselves of the latest sources of information the book possesses decided value.

The section on nervous and mental disease has been under the supervision of Archibald Church of Chicago, and is worthy of careful reading. To physicians whose arduous duties in institutions for the insane render it difficult for them to keep pace with medical literature in its varied branches, this book may be commended as eminently well suited to give the results of the latest investigations. We would especially commend the section on materia medica, therapeutics and pharmacology to those who wish to know about modern remedies.

Pamphlets Received

Annuaire de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique.

The Diagnostic Importance of the Examination of the Feces. By Charles D. Aaron, M. D. Reprinted from the Fort Wayne Medical Journal-Magazine, April, 1901.

Syphilis as a Non-Venereal Disease, with a Plea for the Legal Control of Syphilis. By L. Duncan Bulkley, M. D. Reprinted from the Journal of the American Medical Association, April 6, 1901.

Extra-uterine Abdominal Pregnancy; Operation by the Vagina; Recovery. By Charles Gilbert Davis, M. D. Reprinted from American Medicine, October 19, 1901.

The Diagnosis and Treatment of Round Ulcer of the Stomach. By N. S. Davis, Jr., M. D. Reprinted from American Medicine, November 9, 1901.

Devitalized Air Toxemia a Prime Cause of Tuberculosis. By Charles Denison, M. D. Reprinted from The New York Medical Journal, November 9 and 16, 1901.

Erfahrungen über die therapeutische Wirkung der Elektricität und der X-Strahlen. By S. Erhmann, M. D.

The Stadia of Mental Disease. By Theodore H. Kellogg, M. D. Reprinted from The Journal of Nervous and Mental Disease, November, 1901.

Mirror Writing and Inverted Image. By Albert B. Hale, M. D., and Sydney Kuh, M. D. Reprinted from The Journal of the American Medical Association, November 23, 1901.

Treatment of Acromegaly with Pituitary Bodies. B. Sydney Kuh, M. D.

Political Assassinations in some of their relations to Psychiatry and Legal Medicine. By Charles K. Mills, M. D. Reprinted from The Philadelphia Medical Journal, October 26, 1901.

The Czolgosz Trial: A Unique Event. By Charles K. Mills, M. D. Reprinted from The Philadelphia Medical Journal, October 19, 1901.

A Case of Peripheral Pseudo-Tabes with Exaggerated Reflexes. By Charles K. Mills, M. D. Reprinted from The Journal of Nervous and Mental Diseases, August, 1901.

The Separate Localization in the Cortex and Subcortex of the Cerebrum of the Representation of Movements and of Muscular and Cutaneous Sensibility. By Charles K. Mills, M. D. Reprinted from The Journal of Nervous and Mental Disease, November, 1901.

The Relation of the Medical Editor to Original Communications. By Harold N. Moyer, M. D. Reprinted from the Annals of Gynecology and Pediatry, July, 1901.

The Relative Value of Medical Advertising. By John Punton, M. D. Reprinted from The Kansas City Medical Index-Lancet, July, 1901.

Study of a Typhoid Fever Epidemic. By B. K. Rachford, M. D.

The Present Status of the Carcinoma Question. By N. Senn, M. D.

A Method of Blood Antisepsis. By G. G. Taylor, M. D. Reprinted from The Chicago Medical Record, October, 1901.

Effect of Direct Alternating Tesla Currents and X-Rays on Bacteria. By F. Robert Zeit, M. D. Reprinted from The Journal of the American Medical Association, November 30, 1901.

The Pathology and Bacteriology of Uretero-Intestinal Anastomosis. By F. Robert Zeit, M. D. Reprinted from the New York Medical Journal, May 4, 1901.

Report of Springfield State Hospital, Sykesville, Md.

Half-Yearly Summary

CALIFORNIA.—*Southern California State Hospital for Insane, Patton.*—This institution is very much crowded. There are 750 patients on seven wards, excepting a few on parole. A new three-ward wing is under construction, at a cost of $40,000, which will accommodate nearly 200 people; also a new cottage for the Superintendent, costing $5000. Changes of a sanitary nature in lavatories of all the old wards, are to be made at an expense, when complete, of about $1500.

CONNECTICUT.—A statute has been adopted in the State of Connecticut which permits narcotic and alcoholic patients to voluntarily commit themselves to a sanitarium for treatment for any length of time not exceeding one year. Chapter 230, Section 3690, General Statutes of Connecticut reads as follows:

"The managers, trustees or directors of any inebriate asylum established by the laws of this state may receive any inebriate or dipsomaniac who shall apply and be received into such an asylum, retain him one year and treat and restrain him in the same manner as if committed by the Probate Court."

DISTRICT OF COLUMBIA.—*Government Hospital for the Insane, Washington.*—A contract has been authorized and executed for the construction of twelve buildings. The two principal of these are the two hospital buildings proper, each of which will accommodate 104 to 120 patients. They are arranged especially for the care of acute and special patients whose mental and physical condition requires individualized and special treatment. Each building will have an operating room for surgical cases, and, in connection with these, accommodations for the classes of nurses and students who are receiving training or instruction in the hospital. One of the hospitals will be for men and the other for women. Two buildings will be for disturbed and destructive cases, one for each sex, and each accommodating 120 patients. Another building, accommodating about 104 patients, is designed for the especially untidy and demented classes of men. These buildings are each subdivided so that no one ward will have more than 30 patients in it, thus affording abundant opportunity for classification and control of these particularly troublesome cases. The day rooms are separated entirely from the sleeping apartments, and the latter are so arranged as to permit the most thorough night supervision.

In addition to these buildings there will be six smaller ones, called cottages, each accommodating from 40 to 60 patients. Two will be for

the more tidy and quiet classes of epileptics, and four for the better cases among the more chronic classes. All the buildings for patients will be two stories in height, and the six cottages will have all day rooms on the first floor and all sleeping rooms on the second. Each building will have its own dining room and the hospital buildings will be supplied from a special-diet kitchen.

There will be one building for nurses and attendants, including night nurses, accommodating one hundred. It is proposed at present to locate, on the present building site of the hospital, near its southeast corner and near the Toner Building group, eight of these buildings, including the two hospital buildings and the buildings for employees, and to place the remaining four buildings on the east side of Nichols avenue, directly opposite them and about 300 feet from the avenue. The latter buildings will be used for the accommodation of patients only, the disturbed, destructive, and untidy classes being provided for in two of the buildings, and the two cottages being used for the farm laborers among the patients. The former classes will be the least affected by the comparatively unattractive location, and the latter will be near their work and less inconvenienced by the location than any other class would be. The buildings on the present site, west of the avenue, with the exception of the male hospital, will constitute, with the Toner Building and the Oaks buildings, the female department of the institution. It will provide accommodations for about 600 patients, and this will suffice for the wants of this department for a number of years to come. The building for disturbed women will be located apart from the others and where this class will give the least annoyance possible. The entire group will be so separated from the rest of the institution that the patients can be given outdoor exercise with greater freedom and with less annoyance to themselves and others.

HOSPITAL ADMINISTRATION.

The affairs of the hospital have continued satisfactory during the year. Both in the care and treatment of the patients and in the physical improvement of most of the departments of the institution there has been substantial progress.

The work of the training school and the systematic development of practical nursing in all the hospital wards has had a noticeable effect in stimulating the physicians and nurses to greater efforts in providing for the patients the best that their opportunities afforded. A class of twenty-six nurses was graduated at the expiration of a course of two years of about eight months each, on May 31, 1901. Twelve of the female nurses are now employed in the male hospital wards and their work has been in most instances eminently satisfactory. The experiment is unquestionably successful and the medical staff are a unit in commending it and in advising its extension. It is especially in the care of the feeble, sick, and the acute mental cases, that its advantages are most noticeable. Complaints of neglect and harsh treatment have been unusually infrequent.

In three or four instances nurses have been detailed to care for private patients outside of the hospital, and in every case have acquitted themselves with credit. The work of the school will be still further developed and systematized during the coming year.

The pathological department has been enlarged by the purchase of a bacteriological equipment, and Dr. Cornelius Deweese, for several years pathologist at the Maryland Hospital for the Insane, has been employed as assistant to the pathologist, for the more especial object of developing the clinical work of the department. Blood examinations for malaria and typhoid fever are required in every suspected case. Urine analysis is made in every case admitted, and preparations are under way to begin a study of stomach digestion and the effects upon it of the administration of various remedies, including hypnotics. Every case of tuberculosis is isolated as soon as possible, and opportunities for infection of other patients carefully guarded against.—The Pathological Supplement to the Forty-Sixth Annual Report of the Hospital consists of contributions by Dr. Blackburn on "A Study of Four Intracranial Tumors," "Nine Cases of Cardiac Aneurism," and "Synopses of Post-Mortem Examinations in Twenty-Two Cases of Aneurism of the Aorta."

INDIANA.—*Northern Indiana Hospital for Insane, Logansport.*—Dr. Rogers reports the establishment, by the Trustees, of the grade of junior assistant physician, severally for the departments of men and for women. Doctors Katherine D. Johnson and L. H. Streaker, formerly internes, have been appointed to fill these positions. The institution is in the process of being equipped with additional waterworks, the essential features of which are a multiple system of deep wells, a central plant for compressing air, as a motive means, a central reservoir, and a large additional fire pump. The capacity of the hospital is at present 800.

MASSACHUSETTS.—*Westborough Insane Hospital, Westborough.*

COLONY FOR THE CHRONIC INSANE.

The Westborough Insane Hospital in 1901 purchased a farm of 127 acres, adjoining other hospital land, and has nearly completed buildings for 100 able-bodied, chronic male patients, at a cost of $500 per capita. The buildings will be occupied in the spring.

The three buildings, two of them new, and the third, a remodeled farm house, form a group distant from the main building a mile and a half. They have an independent boiler plant, and electric lighting is furnished from the main hospital plant by the alternating current. The price includes making sewage beds and the disposal of the sewage.

The trustees of this hospital have taken the initiative in Massachusetts in developing the colony plan of caring for the accumulation of chronic insane. The result of the experiment is confidently expected to be satisfactory. The colony plan is being developed in accordance with the policy of the State Board of Insanity.

The trustees have asked the present Legislature for $50,000 to provide a similar group of buildings for 100 able-bodied insane women.

—*Medfield Insane Asylum, Harding.*—The trustees of this Asylum are preparing plans for the erection of a building for excited female patients. This will be a pavilion erected between two of the existing pavilions, and on the same frontal line, and will not destroy the symmetry of the quadrangle. The foundation for the Nurses' Home has been completed and the building will be speedily erected.

—*Boston Insane Hospital, New Dorchester P. O., Boston, Massachusetts.*—The Trustees of this hospital have purchased a tract of land amounting to a little over twenty-four (24) acres, which practically connects the departments for men and women. The plans are nearly completed for two new buildings. One of these buildings will have two wards and will accommodate twenty disturbed patients. The other building will have two observation wards, each accommodating sixteen patients.

MINNESOTA.—*Minnesota School for Feeble Minded, Faribault.*—Two buildings for epileptics are about to be opened, one for thirty boys and one for sixty girls.

MISSISSIPPI.—*East Mississippi Insane Hospital, Meridian.*—The Legislature has appropriated $20,000 for an infirmary cottage for this hospital.

NEW YORK.—*The Society of the New York Hospital, Bloomingdale, White Plains, New York.*—Among the material improvements made by the hospital during the year are a building 60 x 80, containing accommodations for patients in the first story, and a recreation room in the second, and a separate cottage for patients of independent means. The first mentioned building will accommodate about 10 patients, who are subject to occasional periods of disturbance, but whose lives for the most part are placid, and this building is so designed that such patients may have a maximum of comfort, safety and attention. The second story is a large clear room, with a skylight covering more than the third part of the ceiling, and large windows facing east and south. Even in the exposed position which it occupies, on bright days in winter the heat of the sun is almost sufficient to warm it; a little additional artificial heat is provided. It forms an excellent recreation room for the women patients in bad weather, where they are able to indulge in bicycle riding, physical culture, dancing, or any other forms of reasonable amusement, which may suggest themselves from time to time. We have had the benefit of this since the cold weather began, and it seems to have contributed already a very sensible amount of pleasure, as well as healthy occupations to a large number of our women patients.

The separate building, which has been appropriated by the family of one of our patients, presents the usual aspect of a summer or seaside cottage, without any hospital suggestions, and is regarded as a decided success.

During the last summer an adjoining farm of 50 acres was bought, principally to protect our eastern boundary from possible objectionable features, should it not be secured by the hospital. This purchase not

only gives the hospital this very important protection, but it also provides a valuable addition to its dairy and gardening facilities. Upon it is a residence very well adapted for such convalescent patients recovering from general diseases, as may be sent to White Plains from the New York Hospital.

—*Hudson River State Hospital, Poughkeepsie.*

NEW INFIRMARY WARD FOR CHILDREN.

An infirmary ward for 50 beds has just been completed at the Women's Department of the Main Building. The ceilings are sixteen feet high and the room is lighted from all sides. It is provided with toilet and bath rooms and everything necessary for the comfort of the sick and bedridden. There are two single rooms for the dying. As the building is only one story high, and amply supplied with porches, it is expected that the feeble and sick who occupy it will be much more comfortable than they have ever been before.

SUN ROOMS.

A three-story sun room has been erected in connection with wards 2, 6 and 10 of the Main Building. These wards are used for the acute and depressed cases and the additional space and sunlight will undoubtedly be of great advantage. The appearance of the wards is certainly vastly improved. It is hoped that a porch and fire-escape will soon be added and doors have been left on each floor with this object in view.

CENTRAL GROUP.

The wards for disturbed men at the Central Group are undergoing thorough repair. New tile floors and steel ceilings have been put in in several places, and the plumbing is to be entirely renovated and modernized.

—*Middletown State Homeopathic Hospital, Middletown.*—A contract has been let for re-wiring the Administrative Building at a cost of about $1900. Plans and specifications are now being prepared for re-wiring Pavilions 1 and 2 at this hospital. A small addition to the kitchen building is under construction. This will cost about $2973. The new cold storage building has been completed and the refrigerating plant installed during the past six months. A new concrete floor has been put in the dynamo room.

—*Rochester State Hospital, Rochester.*—Contracts have been let for the construction of a central hospital building to accommodate one hundred presumably recoverable cases and for two three-story buildings to accommodate five hundred and fifty-five chronic patients. The Nurses' Home for the accommodation of 120 has been completed.

—*Gowanda State Homeopathic Hospital, Gowanda.*—The foundations have been erected for two buildings, of three stories, which will accommodate about two hundred and fifty patients each. These buildings are to be ready for occupancy before December 1, 1902, and will more than double the capacity of the institution.

—*Manhattan State Hospital, East, Ward's Island, New York City.*—During the latter part of October, 1901, 650 male patients were transferred from the Manhattan State Hospital, East, to the Manhattan State Hospital at Central Islip, and in their place 500 female patients were received from the Blackwell's Island division of the Manhattan State Hospital, West, thus abandoning that division of the Manhattan system.

The admission of women patients to the hospital, and the consequent employment of female nurses and attendants, has made it possible to assign some of the latter to the wards occupied by male patients. This has been done particularly in the case of the hospital and reception wards, and with satisfactory results.

A new kitchen has been erected at the hospital, and will be ready for occupancy in a week or two.

During the past summer, tents were erected on the grounds of the hospital and occupied by patients suffering from tuberculosis. The experiment has proved a great success, and the improvement in the condition of the patients, both mentally and physically, has been marked. In view of the excellent results derived from the use of the tents during the summer months, it was decided to continue their occupation through the winter. This has been done, and the results have been very favorable.

A hydrotherapeutic apparatus, consisting of spray and needle baths, etc., has been installed in one of the wards of the Main Building, and its use has been found to be beneficial to the patients.

The Board of Managers of the hospital having been abolished by recent legislation, the last regular meeting of the Board was held on March 12. The following resolutions were then unanimously adopted by the Board:

Resolved: That the thanks of the Board be and are hereby extended to Dr. A. E. Macdonald, Dr. E. C. Dent and Dr. G. A. Smith, and their assistant superintendents and the physicians of the various hospitals, for the able, efficient and satisfactory discharge of the duties that have been committed to them, which the Board recognizes as having conduced largely to the successful administration of its duties. The Board recognizes the harmonious relations that have existed between the Board and the various officers mentioned, from the time the Board entered upon their duties in 1896 until the present time, and that this deserved tribute is paid to them without any qualification or reservation whatever. The Board desires to express in parting with them its best wishes for their continued success in their careers and regrets that such pleasant relations as have existed must of necessity be severed.

—*Manhattan State Hospital, West, Ward's Island, New York City.*—Since the last Half-Yearly Summary issue of the JOURNAL, the following mentioned work, which was incomplete at that time, has been finished:

The new Verplanck dining-room, then in process of construction,

has been completed and in use since February 4, 1902. This dining-room is connected with the old Verplanck building by an underground passageway, which enables the patients to go to the building for their meals, under cover. The old dining-rooms which heretofore have been used for the patients in the Verplanck building are about to undergo alterations to meet the requirements of the Pathological Institute.

The underground passageway between the new dining-room and the Annex Building has been finished and is now used as a food conduit. It also contains the steam pipes which furnish heat for the Annex Building.

Conduits for the transmission of steam pipes have been constructed between the Verplanck building and the Female Employees' Home, between the Laundry and this Home, and from the Home southerly to meet the main conduit going to the Power House.

The Solarium previously referred to is meeting all expectations in regard to its usefulness for the phthisical cases.

The sea wall mentioned in the last report has been completed; the filling in behind this wall with ashes has been carried on and is now nearly finished. This wall will afford a much needed protection to the western part of this island, which was being greatly excavated by the tide.

In the Laundry, the old method of heating irons by stoves has been abandoned, and the irons are now heated by electricity, an electrical plant having been installed and in satisfactory use for some time.

The small, old-fashioned windows in Wards 17 and 21 have been closed up and modern windows constructed. The wards are thus enabled to receive more light and are better ventilated.

A new greenhouse, about 25 x 100 feet, with an iron frame, has been constructed at the south end of the island, annexed to the old greenhouse. The south end of this new house has been partitioned off, so that one compartment is devoted to the raising of roses. Although completed but a comparatively short time, we are already enabled to furnish many cut flowers and potted plants for the wards. The care of these greenhouses, and the work of propagating and raising plants, are mainly done by women patients under the supervision of a woman attendant. These patients show special adaptability for this work, and are much benefited, both mentally and physically.

Hydrotherapeutics, electricity, massage, etc., have been closely followed with gratifying results.

The usual dances and musical entertainments have been held, and on January 14th, a minstrel exhibition was given by the hospital employees, with great success.

During October and November, transfers of patients were made from the Blackwell's Island Division of the hospital to Central Islip and to Manhattan State Hospital, East, Ward's Island. The hospital property was removed, and this division permanently abolished.

This institution formerly existed on Blackwell's Island as the New York City Lunatic Asylum, accommodating both sexes. In 1877 the male patients were transferred to the new institution on Ward's Island,

and thereafter the department on Blackwell's Island was known as the Female Department. In the year 1894, the patients in the main building were transferred to Ward's Island to occupy the old Immigration Department buildings, and the building vacated by these patients was transformed into the Metropolitan Hospital. At the time of the transfer of the New York City Asylums to State care, February, 1896, the remaining portion of the Blackwell's Island Division was retained for the State use under lease existing five years.

At the present time, all the patients of the Manhattan State Hospitals, East and West, are on Ward's Island.

The course of study for the post-graduate class of the Training School has been enlarged, and an effort is being made to develop this feature of the training school. It is proposed at the end of the school year to issue certificates of proficiency to those who pass an examination bearing upon the lectures given.

Lectures on Psychiatry and clinics have been held at the hospital by Dr. William Hirsch, of the Cornell University Medical School.

—*Craig Colony for Epileptics.*—The population of the Colony is now seven hundred and fifty. The demand for admission of new patients far exceeds the present accommodations. This difficulty will, to a certain extent, be overcome in the near future, when the two new infirmaries, one for each sex, are opened. These buildings are now completed. They will each accommodate fifty patients, but are constructed with a view to future enlargement when occasion demands. They are substantially built and thoroughly equipped for the care of infirm, helpless and disturbed cases, special isolation wards being added to each building for the care of the latter class of patients. A small laundry for the immediate cleansing of all soiled clothing is a part of each of these buildings. When these buildings are occupied, the capacity of the Colony will be approximately eight hundred and fifty.

The third wing of the Trades School is practically completed. This will give an increase of shop room, which is greatly needed, and increase the facilities for teaching.

A conduit has been built connecting all the buildings in the women's group and the Catholic chapel. The steam and water pipes for these buildings have been placed in this conduit and these buildings are now all heated from a central plant in the administration building of the group.

The new Catholic chapel, the gift of the Rt. Rev. B. J. McQuaid, of Rochester, has been completed. The first services in the new building were held January 19.

Two undergrade crossings have been completed on the Pennsylvania Railroad, which runs through the Colony grounds. These will add greatly to the safety of the patients who are obliged frequently to cross this track.

The new bakery and storage building has been practically completed and will be occupied in a short time.

The building of six new dormitories, four for women and two for

men, each to accommodate thirty patients, is contemplated during the coming year.

The Training School for Nurses has been reorganized with the view of furnishing increased instruction. Two lectures, in addition to other instruction, are now given each class weekly. A system of rotation in service has also been established to enable pupils in the Training School to become familiar with all classes of patients cared for at the Colony, and especially to give them practical instruction in the nursing of acute medical and surgical cases.

The medical equipment has been increased recently by the addition to the operating room of a Kny-Scheerer dressing sterilizer and many new instruments. The facilities for operating at the Colony are now equal to those of many general hospitals. A number of recent books on general medicine and surgery, as well as on neurology and allied subjects, have been added to the medical library.

A Journal Club has been organized by the members of the medical staff. This organization meets every two weeks for the review of the large number of medical periodicals taken at the Colony.

North Dakota.—*North Dakota Hospital for the Insane, Jamestown.*—It is purposed during the spring to proceed to the erection of a steel tower forty feet high which is to support a cypress tank 18 feet high and of an inside diameter of twenty feet. The safety factor of the supporting tower is to be five to one. The tower itself will be put together and erected by the hospital force on foundations previously prepared by them. The erection of the tank is to be superintended by an expert supplied by the company securing the contract. The number of patients whose names stand upon the Hospital rolls has slowly increased to about four hundred and thirty. The actual number present is reduced by the parole system to an average of about four hundred and fifteen during the present month. The law providing for the payment of the per capita cost of treatment and maintenance by those patients whose estates are able to bear the same is being vigorously pushed and it is hoped that much additional and sorely needed revenue may be thus placed at the disposal of the financial officer.

Ohio.—*Massillon State Hospital, Massillon.*—Two cottages with capacity for 150 patients have just been completed, and will be occupied as soon as they can be properly furnished. These cottages are for the quiet chronic class of patients, and have no especial features, except that the bathing will be done entirely with shower and needle baths. There will be no bath tubs at all in the buildings. The occupancy of these cottages will make the capacity of this hospital 900.

William McKinley Hall was dedicated on December 19. This is the auditorium building for the institution, and has a seating capacity of 1100. Chapel exercises, concerts, amusements, dances and other entertainments will be given in this hall. The wings of the building are arranged for employees' quarters. The first floor is occupied by the outside help, the second floor by nurses, and the third floor by night watches.

VIRGINIA.—The Constitutional Convention now in session has proposed some radical changes in the system of managing the State Hospitals:

The following is the text of the bill which has been adopted: viz.—

"For each of the four State hospitals for the insane now existing, and for every such hospital hereafter established there shall be a special board of directors consisting of three members, who shall be appointed by the Governor, by and with the advice and consent of the Senate; such board, subject to the approval of the general board of directors hereinafter constituted, shall be charged with the local control and management of the hospital for which it is appointed. The terms of the directors first appointed shall be two, four and six years, respectively, and thereafter upon the expiration of the term of a member, his successor shall be appointed for a term of six years.

"There shall be a general board of directors for the control and management of all the State hospitals for the insane now existing or hereafter established, which shall consist of all the directors appointed members of the several special boards. The general board of directors shall be subject to such rules and regulations as the General Assembly may from time to time prescribe by law and shall have full power and control over the special boards of directors and all of the officers and employees of the said hospitals.

"The general board of directors shall appoint for a term of four years a superintendent for each State hospital for the insane who shall be removable by said board for misbehavior, incapacity, neglect of official duty or acts performed without due authority of law. The special board of directors of each State hospital for the insane, shall, subject to the approval of the general board of directors, appoint for a term of four years all resident officers; and subject to the approval of the special board of directors, the superintendent of each State hospital shall appoint all other employees of such hospital and may remove said officers and employees with the consent of the board that approved the appointment in the first instance.

"There shall be a commissioner of State hospitals for the insane, who shall be *ex-officio* chairman of each of the local boards of directors and of the general board of directors, and shall be held responsible for the proper disbursements of all moneys appropriated or received from any source for the maintenance of the said hospitals. The commissioner shall cause to be established and maintained at all of the hospitals a uniform system of keeping the records and accounts of money received and disbursed and the report thereof. The commissioner shall be appointed by the Governor, by and with the advice and consent of the Senate, for a term of four years. The commissioner shall execute such bond, receive such salary, and discharge such other duties as may be prescribed by law."

—*Central State Hospital, Petersburg.*—The Legislature which has just adjourned made liberal appropriations to the State hospitals. Six

hundred and eighty thousand dollars ($680,000) were appropriated for the care of the insane in the hospitals for the next two years and ninety thousand dollars ($90,000) for permanent improvements—$55,000 of which goes to rebuild that portion of the Eastern Hospital which was destroyed last fall by fire.

The Central Hospital came in for a good share of the "loaves and fishes," getting $200,000 as support fund for two years, and $19,000 for improvements to fire protection and water supply and an additional farm. The superintendent was also favored with an increase in salary.

A steel tower and tank are already in course of construction; a large fire pump, large water mains, more hydrants, hose, new laundry-machinery, etc., will be forthwith installed, and several minor improvements will be made. As early as practicable a "farm colony" will be established on a tract which has been secured. A pathological department may be started before the end of the year. All the colored insane in Virginia are being cared for at this hospital. The number is 1060. The institution is not overcrowded. Separate buildings are provided for epileptics—a most satisfactory arrangement of things.

Governor Montague is pursuing the same wise policy followed by his predecessor, in selecting good practical business men—men not much given to politics—for membership on the Boards of Directors for the Hospitals. For several years past this hospital has been free from political interference of every character, consequently harmony and discipline prevail.

The superintendent has asked permission of the Board to appoint two or more clinical assistants on the medical staff. The selections will be made from the medical schools of the State, if suitable young men can be found.

WISCONSIN.—*Milwaukee Hospital for Insane, Wauwatosa.*—The improvements made at the Milwaukee Hospital for Insane during the past year are as follows:

The conversion of the third and fourth floors of the administration building into wards for the laboring class of patients. The capacity of the two wards is 130 in the aggregate.

The shaft formerly occupied by the passenger elevator has been rendered thoroughly fireproof and an iron stairway with slate treads is being constructed therein, extending from basement to fourth floor. An additional fire-escape stairway on the outside wall of the building is in process of erection. These, it is believed, will furnish adequate protection in the way of escape from these new wards in case of fire or panic.

The wards in each wing, which will be vacated by the removal of the laboring class to the new wards referred to, will be converted into strictly hospital wards and they will meet a long-felt want, as heretofore the sick and acutely excited cases have necessarily been thrown together to a considerable extent.

The excavation for a new building has just been completed. This building, which will be located in the rear of the north wing, will be

80 x 40 ft., and three stories with a high basement and will contain in the basement a dining-room for the laboring class, and three bowling alleys; the first story will be used for a carpenter shop; the second story for a mat and basket shop and for the pursuit of industrial work of all kinds during the winter season; the third story will, for the present, be used for storage purposes. The carpenter shop is at present located directly over the engine room and as this is regarded as a hazardous arrangement, new space for it will be provided as described. The old carpenter shop will then be used for a sewing room and the present sewing room added to the ironing room.

A barber shop with complete appointments, has been established in the basement and the services of a barber secured to do all the tonsorial work of the Hospital. A very noticeable improvement in the appearance of the patients has resulted.

The experiment of employing women patients at light gardening will be made on the opening of the spring season and a parcel of land, adjoining a grove devoted to the use of the women patients will be set aside for that purpose.

Among the improvements and additions projected for the coming season may be mentioned a new green-house of ample dimensions; a new dynamo of 500 lamp capacity, making the total lighting capacity about 2000 lamps; and lastly a synchronized system of time throughout the wards and departments.

The present population of the Hospital is 500 and the total capacity is 630.

DOMINION OF CANADA.—*Protestant Hospital for the Insane, Montreal.*—An additional brick building is in process of construction, and it is expected to be ready for occupancy in the early summer. It will afford accommodation for 100 patients, and relieve the existing congestion in the Main Building.

A kitchen of modern design is also being built from which all the inmates will be supplied. In connection with it is a cold storage plant and also a bakery.

—*Nova Scotia Hospital, Halifax.*—A new building has just been completed, containing a large congregate dining-room, smaller dining-rooms for nursing staff, a very comfortable and well appointed recreation hall, etc. A number of the old ward dining-rooms will be converted into patients' rooms, and in this way the accommodation for patients will be considerably increased. The curriculum in the training school for nurses has been extended. The regular classes, conducted by the members of the hospital staff, have been supplemented by a course of 15 lectures by Halifax physicians. Members of the senior class are required to write an essay on some allotted topic (always bearing upon the practice of nursing), each month. Instruction is now being given in the preparation of food for the sick.

Appointments, Resignations, Etc.

Acheson, Dr. John H., resigned as Medical Interne at the Hudson River State Hospital, Poughkeepsie, N. Y.

Bacon, Dr. John L., resigned as Assistant Physician at the Westborough Insane Hospital, Westborough, Mass.

Baketel, Dr. Roy V., formerly Medical Interne, promoted to be Third Assistant Physician at the Taunton Insane Hospital, Taunton, Mass.

Baldwin, Dr. W. P., appointed Resident Physician at the Minnesota School for Feeble-Minded, Faribault, Minn.

Barrett, Dr. Albert M., appointed Pathologist at the Danvers Insane Hospital, Hathorne, Mass.

Brown, Dr. J. R., appointed Assistant Physician at the Eastern Hospital for the Insane, Knoxville, Tenn.

Budd, Dr. Frank T., resigned as Assistant Physician at the Worcester Insane Hospital, Worcester, Mass.

Cotton, Dr. Harry A., Junior Assistant, promoted to be Assistant Physician, at the Worcester Insane Hospital, Worcester, Mass.

Denson, Dr. E. G., appointed Assistant Physician at the East Mississippi Insane Hospital, Meridian, Miss.

Deweese, Dr. Cornelius, formerly Pathologist at the Maryland Hospital for the Insane, appointed Assistant to the Pathologist at the Government Hospital for the Insane, Washington, D. C.

Doeson, Dr. T. L., resigned as Assistant Physician at the East Mississippi Insane Hospital, Meridian, Miss.

Doran, Dr. Robert E., formerly Second Assistant Physician at the Willard State Hospital, Willard, N. Y., appointed First Assistant Physician at the Craig Colony for Epileptics, Sonyea, N. Y.

Emrich, Dr. E. L., First Assistant Physician, transferred from the Cleveland State Hospital to the Massillon State Hospital, Massillon, Ohio.

Findley, Dr. H. P., resigned as First Assistant Physician at the Massillon State Hospital, Massillon, Ohio.

Fish, Dr. John E., formerly Second Assistant Physician at the Taunton Insane Hospital, Taunton, Mass., appointed Medical Visitor of the Massachusetts State Board of Insanity.

Fitzgerald, Dr. T. F., resigned as Assistant Physician at the Eastern Hospital for the Insane, Knoxville, Tenn.

Fleming, Dr. Margaret A., resigned as Assistant Physician at the Worcester Insane Hospital, Worcester, Mass.

Francisco, Dr. David E., resigned as Assistant Physician at the Middletown State Homeopathic Hospital, Middletown, N. Y.

Gorrill, Dr. George W., appointed Medical Interne at the Buffalo State Hospital, Buffalo, N. Y.

Gurley, Dr. Revere R., resigned as Assistant Physician at the Worcester Insane Hospital, Worcester, Mass.

HUXLEY, DR. FRED., resigned as Resident Physician at the Minnesota School for Feeble-Minded, Faribault, Minn.

HUYCK, DR. CLIFFORD J., appointed Assistant Physician at the Westborough Insane Hospital, Westborough, Mass.

JOHNSON, DR. KATHERINE D., appointed Junior Assistant Physician at the Northern Indiana Hospital for Insane, Logansport, Ind.

KIRBY, DR. GEORGE H., Junior Assistant, promoted to be Assistant Physician at the Worcester Insane Hospital, Worcester, Mass.

KNAPP, DR. J. R., formerly Junior Physician, promoted to be Assistant Physician at the Manhattan State Hospital, East, Ward's Island, New York City.

KRIEDT, DR. D., appointed Resident Physician at the Minnesota School for Feeble-Minded, Faribault, Minn.

LA MOURE, DR. HOWARD A., formerly Medical Interne at the Rochester State Hospital, Rochester, N. Y., appointed Third Assistant Physician at the Craig Colony for Epileptics, Sonyea, N. Y.

LAWLOR, DR. F. E., appointed Second Assistant Physician at the Nova Scotia Hospital, Halifax, N. S.

LOCKWOOD, DR. GEORGE B., resigned as Assistant Physician at the Medfield Insane Asylum, Harding, Mass.

LOWD, DR. HARRY W., appointed Medical Interne at the Taunton Insane Hospital, Taunton, Mass.

MACK, DR. WILL G., appointed Assistant Physician at Brigham Hall, Canandaigua, N. Y.

MARSHALL, DR. AUGUSTUS T., appointed Medical Interne at the Taunton Insane Hospital, Taunton, Mass.

MCDONALD, DR. WILLIAM, JR., appointed Interne at the Butler Hospital, Providence, R. I.

MILLS, DR. GEORGE F., appointed Junior Physician at the Manhattan State Hospital, East, Ward's Island, New York City.

MOORE, DR. E. F., resigned as Second Assistant Physician at the Nova Scotia Hospital, Halifax, N. S.

MORRIS, DR. C. D., resigned as Assistant Physician at the Eastern Michigan Asylum, Pontiac, Mich.

PACKER, DR. FLAVIUS, formerly First Assistant Physician at the Matteawan State Hospital, Fishkill, N. Y., appointed Medical Superintendent of the Insane Department of Bellevue Hospital, New York City.

SANFORD, DR. WALTER H., appointed Medical Interne at the Matteawan State Hospital, Fishkill, N. Y.

SCHORER, DR. CORNELIA B. J., appointed Female Physician at the Worcester Insane Hospital, Worcester, Mass.

SCOTT, DR. JESSE M. W., formerly Assistant Physician, promoted to be First Assistant Physician at the Matteawan State Hospital, Fishkill, N. Y.

SHARP, DR. EDWARD A., formerly Assistant Physician at the Craig Colony for Epileptics, Sonyea, N. Y., appointed Assistant Physician at "Falkirk," Central Valley, N. Y.

SLACK, DR. FRANCIS H., resigned as Medical Interne at the Taunton Insane Hospital, Taunton, Mass.

SMILEY, DR. ALTON, formerly Medical Interne at the Buffalo State Hospital, Buffalo, N. Y., promoted to be Junior Assistant Physician at the Manhattan State Hospital, Ward's Island, New York City.

STREAKER, DR. L. H., appointed Junior Assistant Physician at the Northern Indiana Hospital for Insane, Logansport, Ind.

SWINNEY, DR. EVA F., resigned as Assistant Physician at the Westborough Insane Hospital, Westborough, Mass.

TURNER, DR. O. M., resigned as Second Assistant Physician at the State Insane Hospital, Jackson, Miss.

WALDO, DR. LOUIS T., Assistant Physician, transferred from the Hudson River State Hospital, Poughkeepsie, N. Y., to the Willard State Hospital, Willard, N. Y.

WALTER, DR. B. S., appointed Second Assistant Physician at the State Insane Hospital, Jackson, Miss.

WATERS, DR. MARY A., appointed Assistant Physician and Pathologist at the Springfield State Hospital, Sykesville, Md.

WEIGAND, DR. FRANK J., formerly Medical Interne, promoted to be Junior Assistant Physician at the Matteawan State Hospital, Fishkill, N. Y.

WICKLIFFE, DR. JOHN W., resigned as Assistant Physician at the Manhattan State Hospital, East, Ward's Island, New York City.

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ERRATUM.

The following description should have been inserted at page 482 in the January number of the Journal.—EDITOR.

DESCRIPTION OF PLATES.

PLATE XIX.

FIGS. 1 2.—Large motor cell in left paracentral lobule showing pulverulent chromatic substance.

Polychrome Methylene Blue, section 3 m.

Leitz 1-12 Oil Im., Oc. 4.

FIG. 3.—Cell of same region from another case, showing more nearly normal arrangement of Nissl bodies.

FIG. 4.—Purkinje cell showing considerable chromatolysis.

Polychrome Methylene Blue, section 3 m.

Leitz 1-12 Oil Im., Oc. 4.

PLATE XX.

FIG. 1.—Miliary aneurism surrounded by round cells and red blood-cells in the softened area of the left temporo-sphenoidal lobe.

Section 6½ m. Van Gieson stain.

Leitz, 7 Ob., Oc. 1.

FIG. 2.—Cortex of softened area in the same region, showing infiltration with various cells.

Section 3 m. Polychrome stain.

Leitz 1-12 Oil Im., Oc. 4.

FIGS. 3 & 4.—Same region.

Hæmatoxylin and Eosin stain showing infiltration and newly formed vessels with hemorrhages.

FIG. 5.—Vessel from right temporo-sphenoidal lobe showing moderate proliferation of nuclei.

PLATE XXI.

FIG. 1.—Small vessel showing proliferation of nuclei.

Right paracentral region.

Van Gieson stain.

Leitz, Ob. 4, Oc. 3.

FIG. 2.—Vessels from left superior frontal region showing moderate fibrous thickening.

Section 6½ m. Van Gieson stain.

Leitz, Ob. 7, Oc. 3.

FIGS. 3-4-5-6.—Vessels in cases of brain syphilis showing types of syphilitic changes. (Inserted for comparison.) Van Gieson stain.

PLATE XXII.

FIGS. 1 & 2.—Cells from right temporal region showing neuroglia nuclei in pericellular space.

Nissl stain.

Leitz 1-12 Oil Im., Oc. 4.

FIG. 3.—Similar change in right hippocampal region.

Same stain and magnification.